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THE IRON AGE

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Reading Matter Contents.....page 76
Alphabetical Index to Advertisers " 292
Classified List of Advertisers " 281
Advertising and Subscription Rates " 86

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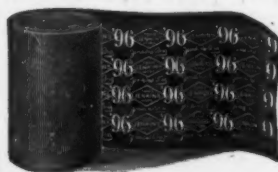
See page 64

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THE IRON AGE

New York, Thursday, July 1, 1909.

BUILDING AN INDUSTRIAL CITY.

The Development of the Residence Portion of Gary, Indiana—Public Utilities Problems and How They Were Handled.

Second in interest only to the already famous steel works are the remarkable industrial enterprise and civic development displayed in the building of the city of Gary, Ind. In a series of articles already published in *The Iron Age* details have been given of the construction

able for those compelled to live in the immediate vicinity while engaged upon the works. But it was at once apparent that, whatever might suffice for temporary needs, the building, not of a village, but of a city, must be embraced in the plans for this industrial community. It



Fig. 1.—Panoramic View of Manufacturing and Residence Districts of Gary, Ind., Taken January 12, 1909.—Jackson Park in Foreground.



Fig. 2.—Panoramic View of Residence Portion of Gary, Ind.—Taken January 12, 1909.—Jefferson School at Left, Jackson Park in Foreground.

and equipment of this unparalleled steel plant. Something may now be said of the building of the city. When the choice of a site for the Gary Steel Works fell upon the unoccupied waste of sand dunes skirting the boundaries of Lake Michigan in Indiana, a region practically isolated from surrounding centers of population, the provision of houses for workmen became an immediate necessity. At the start construction camps composed of rudely improvised shacks were the only shelters avail-

able for those compelled to live in the immediate vicinity while engaged upon the works. But it was at once apparent that, whatever might suffice for temporary needs, the building, not of a village, but of a city, must be embraced in the plans for this industrial community. It

The creation within a period of months instead of

K.K. Dec. '09.



Fig. 3.—Fifth Avenue, Looking West from the Southeast Corner of Broadway, August, 1906.—Contrast with Figs. 7 and 8.

years of a full fledged city, supplied with all modern conveniences in the way of public utilities, was therefore the problem involved in the establishment of Gary. The initial step in its solution was the formation in 1906 of the Gary Land Company as a subsidiary to the United States Steel Corporation. Of the 9000 acres to which this company acquired title on the south shore of Lake Michigan, a portion comprising a strip of land immediately south of the steel works and separated from the plant by the Grand Calumet River was platted as a town site. Parenthetically it may be said that the term "Grand" as applied to this so-called river is woefully misleading, since if it ever possessed any attributes of grandeur they have long ago been obliterated in some shift of nature.

The Steel Corporation and the City Government.

As at present arranged the limits of the city extend beyond the holdings of the Gary Land Company and include an addition of considerable size on the south side of the town owned by other individual and corporate interests. This section of the city, not being under certain restrictions which in the interest of orderliness govern the uses to which property sold by the Gary Land Company may be put, has acquired the title of "The Patch." Aside from its position as large property owner and holder of public franchises the Steel Corporation has no connection with or voice in the municipal government, which is organized and controlled in the same manner as in other cities in Indiana. In taking over the franchises for water, gas and electric service the steel company as represented by the Gary Land Company

and the Gary Heat, Light & Water Company had no desire to extend its industrial activities in this direction, but was impelled by the exigencies of the situation. To safeguard properly the health and welfare of the rapidly growing population it was imperative that such improvements should be completed without delay. Yet their installation upon a scale commensurate with probable future requirements involved an outlay of capital wholly beyond the means of the embryonic municipality and not readily within reach of outside investors. The work undertaken by the land company less than three years ago has been accomplished and to-day a city of 15,000 inhabitants, wholesome in its sanitation and enjoying all the conveniences of modern civilization, has sprung into existence.

Sewage System and Water Service.

Because of the unsanitary conditions surrounding the 7000 people early assembled upon the site, the first in order of public utilities to claim attention was a comprehensive system of sewers. This work, carried forward with all possible dispatch, was soon completed, with the result that the city has 11 miles of well constructed concrete sewers. The system connects with a main north and south sewer 8 ft. in diameter, discharging into the Calumet basin. Having a central elevation of 22 ft., with ample fall to south and east for drainage flow, the city is most advantageously located in this respect. The need of greater precaution in the disposal of sewage being foreseen, the use of septic tanks is now being considered. Just what system will be adopted has not been decided, but it is planned to erect an effective



Fig. 4.—First View Taken of the Site (July 1, 1906) After Work Had Begun.—The Building on the Right, the First Erected, was Occupied by the Gary Land Company.



Fig. 5.—October 22, 1906.—Looking North on Broadway from Wabash Railroad Tracks. Ninth Avenue—Extreme South Line of Land Company's Subdivision.

disposal station of some kind at a point 3 miles east of the city.

The permanent water supply will be taken from Lake Michigan through a 6-ft. intake tunnel extending outward 8000 ft. from the shore line. Its approximate length to the point of delivery at the pumping station is 3 miles. The tunnel, which has just finished and is only awaiting the installation of the pumps to be put in service, is brick lined and cement coated. Pending the completion of the permanent system, a temporary plant taking water from a group of seven driven wells supplies the city. Water from this source is pure and wholesome, being filtered through a deep underlying bed of sand. The new pumping station will be housed in a brick and concrete building now under construction in Jackson Park, and arranged to accommodate the electric plant as well as pumping machinery. The latter equipment consists of four centrifugal or turbine pump units, each independently driven by a direct connected electric motor, through a flexible coupling. Two of the pumps are designed for domestic and two for fire service, each having a capacity of 3500 gal. per minute or a combined capacity of about 20,000,000 gal. in 24 hr. The motors driving the primary or domestic pumps are of 250 hp., and those operating the fire pumps 175 hp. capacity each. The latter are piped to draw water from the discharge pipe of the primary pumps, and force it into the distributing mains at a pressure of 50 lb. in excess of

that in the pipe from which the water is drawn. While operated as a direct pressure system a steel tower tank provides auxiliary service for use in emergency.

Electrical Equipment.

The availability of surplus electric current cheaply produced by means of furnace gas in the power stations of the steel works, made the installation of a municipal generating plant unnecessary. The electrical machinery and appliances comprising the equipment for the new light and power station are therefore limited to converters, transformers, switchboards, &c. Alternating current carried over at 6600 volts is stepped down to 2200 volts through three 300 kw. and three 250 kw. static transformers for distribution over the incandescent circuit, from whence it is reduced through outside transformers to 52 or 110 volts before reaching the lamps. Six similar transformers of 300 kw. capacity each are used for reducing current required for the operation of pump motors. Two motor generator sets, one of 100 kw. and one of 200 kw., handle the 6600-volts, which pass to the arc light circuit through nine static transformers. Space has been reserved for an additional generator set. Both the water and light plant have capacity far in excess of present requirements, having been designed and constructed with a view to meeting the larger demands that will come with the inevitable rapid growth of the city. A gas plant capable of producing 225,000 cu. ft.



Fig. 6.—The First Houses Were Shacks Built Along the River by Laborers. These Have Practically All Disappeared.—View Taken March 15, 1907.

of gas per day, with provision for enlargement to four times its present size, furnishes gas for fuel and illumination.

The First 500 Houses.

Laid out in rectangular blocks, bounded by broad streets, its main thoroughfares lined with substantial business blocks and the residence sections studded with well built homes, Gary presents a metropolitan appearance quite beyond what might be expected considering its newness. While essentially an industrial city, it is unmarred by the makeshift construction often a feature

built these had not circumstances in the beginning compelled the undertaking. The problem of furnishing living quarters for the army of wage earners which will eventually be employed in the steel plant has not yet been worked out. It may possibly be solved by the construction of small concrete houses built for rental or sale by outside capital.

Twenty-five Miles of Cement Sidewalks

have been laid, and the principal streets, including Broadway, Fifth, Sixth and Seventh avenues, also nine residence streets, are paved, the first three with concrete and

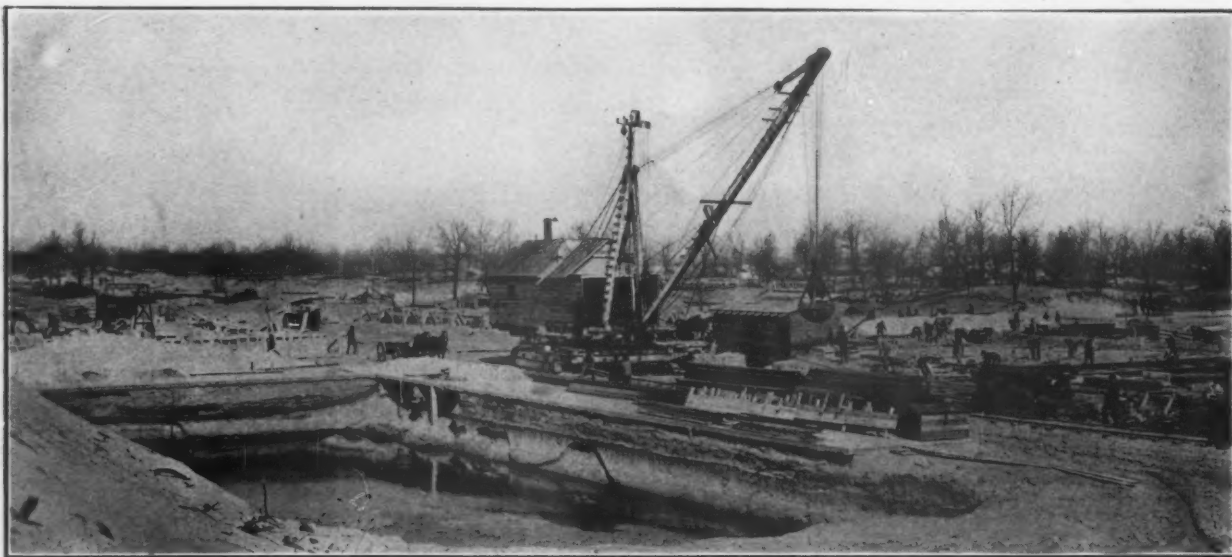


Fig. 7.—Intersection of Broadway and Fifth Avenue, May 2, 1907.—See Figs. 3 and 8.



Fig. 8.—Intersection of Broadway and Fifth Avenue. Looking East on Fifth Avenue from Washington Street Across Broadway.—Same Site as in Figs. 3 and 7.

of such communities. The first houses built were constructed by the Gary Land Company to provide homes for employees of the steel works. Five hundred modern dwellings of frame, brick and concrete construction, costing from \$1600 to \$10,000, were built. These are all occupied, as are all other habitable houses in the town, and many persons whose daily occupation brings them to Gary are compelled to live elsewhere because of the lack of dwellings. One thousand additional houses, it is said, would scarcely equal the present demand for homes. It is not the purpose of the land company to build more houses either for rent or for sale, nor would it have

the rest with macadam. Churches of three denominations have already been built, and four others are being erected. Due attention has also been given to the provision of educational facilities. One public school building costing \$80,000 has been finished and is occupied, and another to cost \$200,000, now in course of erection, will be opened in the fall. Besides these there are a \$50,000 parochial school and a public library.

The branches of trade represented in merchandising institutions include dry goods, department, hardware, grocery, drug, clothing, jewelry, shoe and furniture stores; also laundries and bakeries. There are doing

business in the city two trust companies, one national and one State bank, six hotels and four newspapers, three daily and one weekly. Electric street car service is furnished by the Gary & Interurban Company, which operates cars on Broadway between Third and Twenty-fourth avenues and on Eleventh avenue between Broadway and Tolleston, a nearby village. A through interurban road, the Chicago, Lake Shore & South Bend electric line, operates trains running between South Bend and Chicago, entering the latter via Kensington over the tracks at the Illinois Central Railroad, its station being located at Broadway and Third avenue near the Union Depot of the Lake Shore & Michigan Southern and Baltimore & Ohio railroads. On the steam roads entering Gary and having their western terminals in Chicago 50 trains stop daily.

desire being to prevent unwarranted expansion in this direction. In consequence of the conservative policy pursued, the construction of business houses has not overreached the demand, and all of the storerooms and offices completed have found tenants even before completion. The wisdom of this course is further attested by the fact that no failures of merchants doing business in the city have been recorded. Every effort, however, is made to induce the rapid building of homes, for it is seen that when the plans of the steel plant have been carried out and the works are running at full capacity employment will be given to from 12,000 to 14,000 men, for whom and their families accommodations must be provided. In addition to the large population thus represented the employees of the shops of the American Car &



Fig. 9.—June 30, 1908. Broadway Looking South from Lake Shore Railroad Track.



Fig. 10.—November 6, 1908. Broadway, Looking North from Eighth Avenue.

Property Restrictions.

Owing to the manner in which the town property is handled by the land company, speculation, with the attendant evils usually marking the quick upbuilding of a promising town, is effectively prevented. Each lot is sold on a contract containing a provision requiring the purchaser to erect a building of prescribed character, the construction of which must be begun within six months and completed within 18 months from the date of contract. All lots belonging to the land company, moreover, are sold subject to restriction with respect to building lines and sale of liquor. Under the conditions imposed there are only four locations in the city where liquor may be sold, and the occupancy of these is strictly subject to regulation and control of the land company. All investments in business property and improvements in advance of demand have been steadily discouraged, the

Foundry Company, the American Bridge Company and the American Locomotive Company, all to be located on the outskirts of the city, will swell by several thousand the number for whom homes will be sought in Gary.

Two parks occupying central locations have been laid out. Jackson Park, the larger of the two, lies four blocks west of Broadway, the principal thoroughfare. It contains four city blocks covering a site which will require but little work to make it an attractive spot. The other park lies two blocks east of Broadway.

What the population of Gary will be within the next five or six years cannot be accurately foretold, but those who have prophesied for it 50,000 inhabitants by 1915 are not generally regarded as overoptimistic.

The accompanying views, Figs. 1 to 10, illustrate the various steps in the building up of the city and the provision of transportation and other facilities.

THE PANAMA CANAL—I.

How Machinery Has Made It Possible.

BY J. F. SPRINGER.

The building of the Panama Canal ranks as the greatest engineering undertaking in history. This is not because of its length—about 49 miles—for the Kaiser Wilhelm Canal (61 miles) and the Suez Canal (104 miles) are both longer, but because of the stupendous work involved. The Panama route runs through an elevation that was about 312 ft. above the sea level. To dig a trench through this divide down to 40 ft. above sea level means excavating to a depth of about 272 ft. While this diminishes to either side of the summit of the saddle, there is still left a monster cut about 9 miles long. The problem involves not merely digging, but disposing of the spoil. It cannot be piled on the hillsides, for it is frequently difficult to keep them from caving down themselves. In fact the Culebra cut—as the trench through the divide is called—demands extravagant excavating to prevent slides. To get rid of the enormous spoil it must be trans-

Gatun dam will be Gatun Lake, 163 square miles in area, which will submerge a large portion of the basin of the Chagres River and thus effect control of the floods.

By contrast the Suez Canal was a much smaller proposition, for while in excavation it was comparable, perhaps, there was no monster cut to be made, no dam to build and no locks to construct. Practically it involved only digging and dredging; the levels of the Mediterranean and Red seas are the same and no inconstant Chagres River had to be controlled, not even a current managed. The difficulties were of another kind—mainly political. Under pressure from England the native labor was cut off, promising for a time the collapse of the entire undertaking. But this spurred the French in developing machinery. Their great dredges used in the late sixties could excavate upward of 3000 cu. yd. a day of the relatively easy material, and 60 such dredges could

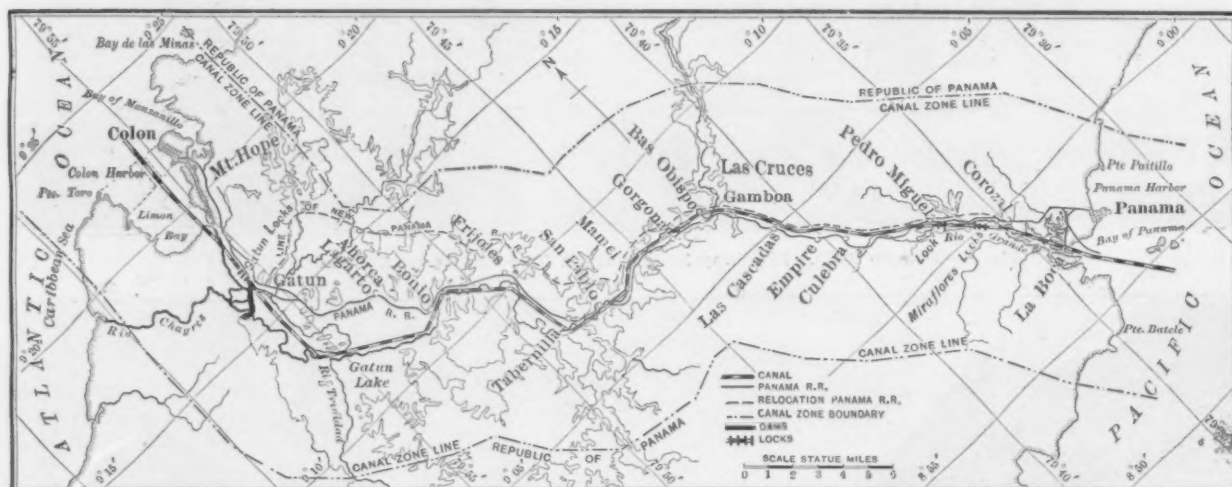


Fig. 1.—Map of the Panama Canal Zone.

ported in some cases 14 miles, and the removal of the material excavated from Culebra cut is alone a monster proposition. There has probably never been a previous instance of excavation and removal on such a scale. The great pyramid of Cheops may be regarded as the greatest engineering proposition of antiquity, but it involved little transportation. The great wall of China—35 ft. high, 21 ft. thick and 1250 miles long—is perhaps a close approximation as regards quantity of material involved, but the parallel can scarcely be carried much further. The Culebra cut is, however, only one feature of the Panama undertaking.

The canal extends northwest and southeast—and not east and west, as may be seen by the map in Fig. 1. A few miles south of the Atlantic end the surface of the water is to be 85 ft. above sea level, requiring a monster dam at Gatun, which will be another notable work by itself. It will be $1\frac{1}{2}$ miles long, nearly $\frac{1}{4}$ mile wide at the base and 115 ft. high above sea level. At the east end of this gigantic earth dam will be the Gatun locks, in three steps, through which ships will be raised the 85 ft. Each lock will be nearly 1.5 mile long, and wide enough to accommodate the largest ship afloat or contemplated. The locks are to be of concrete and will rest on a foundation of rock. Near the south or Pacific end will be the Pedro Miguel and Miraflores locks, effecting the necessary change of level on that side. Constructing all these locks means a tremendous amount of work. Another big engineering problem is the control of the Chagres River, which now crosses the canal location about 25 times and is capable of wonderful rises at short notice. Back of the

make a fine showing. In the main, disposing of the spoil presented no difficulty, as it was carried off by a long spout and deposited on the flat shore. At Panama the conditions are decidedly different. Much of the dredged material must be carried long distances by barges or the dredge itself before finally disposed of. The Suez Canal cost something less than \$100,000,000. Already the Americans have expended, excluding the \$40,000,000 paid the French, as much as De Lesseps spent at Suez. The French companies operating at Panama before American control sank about \$250,000,000. No doubt much money was illegitimately spent by the old French company, so that it is not fair to say that the canal has already cost \$350,000,000. Probably \$300,000,000 more will be spent before the canal is finished.

The Routes Considered.

The canal will extend in an irregular line from the neighborhood of Colon, on the Atlantic side, to the vicinity of the city of Panama, on the Pacific side. The route chosen is not the only possible one, nor the shortest; several others were considered. At the Isthmus of Tehuantepec Captain Eads proposed to construct a railroad to transport the largest ships from ocean to ocean. Further south the Nicaragua route was proposed for a ship canal. A river and a considerable lake could have been taken advantage of, considerably reducing the amount of actual digging. This route was actively urged during the days of the new Panama Company. Work was actually begun and for a time there was some possibility of two canals—one French and one American. Upon the isthm-

mus itself more than one possible route exists. When in 1513 Balboa discovered the waters of Panama Bay on the Pacific side he had traversed one of the shortest lines between the oceans, but the height of the intervening ridge is so great that the advocates of this route proposed constructing a maritime tunnel. If this San Blas proposition had been carried out this tunnel, several miles long and in which the waters of two oceans mingled, would have been one of the wonders of the world. There are one or two more possible routes, but, all things considered, the present route seems to be the best. It approximates the line of march of Sir Henry Morgan in the latter part of the seventeenth century, when at the head of 1200 other pirates he advanced on the city of Panama, through which the silver, gold and pearls of the Pacific passed on their way to the old world. A splendid road connected the city with Porto Bello, its Atlantic port, remnants of which have been found recently. After Morgan pillaged the city he burned it, but the commercial advantages of its location were such that it was shortly rebuilt near the same place. That it might be inaccessible to pirates it was built upon a coral formation jutting out into the Bay of Panama, was walled at an expense of

International Congress held at Paris in 1879, which De Lesseps thought would cost about \$127,000,000 and be finished in eight years. Unforeseen difficulties soon arose which made more money necessary. Until 1889 the company continued at work and accomplished considerable, but the bribery and corruption in general must have been enormous. So widespread was the graft that the investigation and prosecution were probably not fully consummated because of the prominence of some of the people involved. Extravagant salaries and expenditures were allowed and useless material purchased. For instance, snow shovels have been found on the Isthmus, left by the French. At length a sea level canal was abandoned for the lock type, but the confidence and purses of the French people became exhausted and the crash came in 1889, involving multitudes of innocent people. Subsequently much of the graft was exposed. The old company passed into the hands of an officer of the courts similar to our receiver, and to save the assets—which were estimated at about 54 per cent. of the total amount invested by the French people—it was imperative to go on. In 1894 the New Panama Company was formed, which never had much money and no real en-

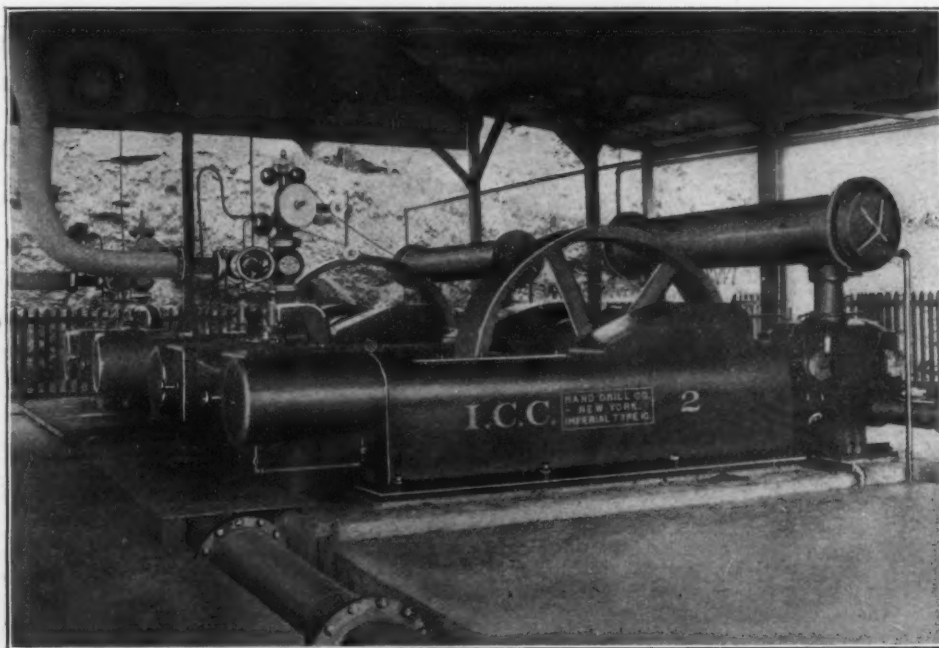


Fig. 2.—Ingersoll-Rand Air Compressors in the Power House at Rio Grande Superior.

\$11,000,000 and provided with a moat. So complete were the defenses that the experiences of the old city were not even partially repeated. The present population is 30,000 or more, and when the canal is opened the city is certain to become an important one, as will also Colon, at the other end of the canal.

The present operations of the Americans at Panama are not the first there. The discovery of gold in California in 1849 brought the Isthmus into prominence as an important route from the eastern United States to California, and a railroad was constructed which was originally about 47 miles long and connected Colon and Panama. At the Colon end particularly it was difficult to make a road-bed through the swamps. Depths ranging between 100 and 200 ft. were sounded and no bottom reached, but by piling in timber, earth and rock a more or less uncertain foundation was formed. The Panama Railroad is now being largely relocated, necessitated in part by the changes in topography which will follow the completion of the canal.

The French Work.

De Lesseps, who successfully completed the Suez Canal in 10 years, headed the old Panama Company in 1879, when the French enthusiastically undertook uniting the Atlantic and Pacific oceans. On the first day of 1880 the first stroke of the pickaxe was made upon the Pacific side and actual construction began the following year. Initially a sea level canal was decided upon by an

thusiasm. Serious construction ceased with the collapse of the De Lesseps company.

Meanwhile the United States became interested in the Nicaragua canal. Although the distance between the oceans is much wider, the utilization of Lake Nicaragua and the San Juan River were attractive. The engineering difficulties were, however, formidable. A dam would have to be thrown across an undivertible river, a cut made equivalent to that now being made at Culebra, the harbor on the Atlantic coast would be precarious, and, most serious of all, earthquakes are common in that district. Although work had commenced, the Government decided to abandon it when it was learned that the New Panama Company was willing to sell its interests and machinery. In general the Americans are following the same route adopted by the French, to take advantage of the work already done. When they assumed control in 1904 the French had removed about 71,000,000 cu. yd., or about two-sevenths of the excavation necessary to complete the wider and deeper canal now proposed. The lock type of canal has also been adhered to, principally because it can be built quicker and cheaper than a sea level canal. The latter would be ideal when finished, but for a large part of the length the trench would have to be 85 ft. deeper, and its necessarily V-shaped cross section would enormously increase the material to be removed. Reducing this by following the natural configuration of the country, even if practicable, would make the

canal too crooked for speedy navigation. So attractive is a canal without locks that the majority report of the Board of Engineers for the Panama Canal in 1906 favored this type, but the minority report prevailed.

The canal begins on the Atlantic side at the 40-ft. line and for about 7 miles the level is that of the Atlantic Ocean. At Gatun the level is suddenly raised 85 ft., and is maintained for 30-odd miles through the Culebra cut and out upon the Pacific slope to Pedro Miguel. The remaining 10 miles to the 40-ft. line in the Pacific is at two different levels, changed at Miraflores. A large part of the central section will not resemble a canal, as it will include the lake impounded by the Gatun dam, through which the canal channel will run. At Obispo, the northern end of the Culebra cut, the canal appearance will be resumed where the canal will cross the ridge between Gold Hill and Contractors Hill. The Gatun dam is to withstand the entire difference of level, or as much as the Pedro Miguel and Miraflores dams combined, consequently it presents the greatest problem so far as dam construction is concerned.

The Gatun Dam.

At one time it was proposed to construct the dam further inland, at Bohio, where the valley being quite

through this channel until the concrete lining is above the high water mark.

In Fig. B, on the supplement, is shown the north end of the spillway excavation. Beyond the horizon lies the Atlantic Ocean. The canal itself will pass far to the right, for the foreground of this view represents the very center of Gatun dam. The Chagres River now passes through an old channel constructed by the French, which is off to the left of the view. At the time the photograph was taken the trestle work which will be used in building the rock wall forming the north toe of the dam was still under construction. In Fig. C is another view of the spillway—the southern end—looking up the Cragres Valley toward what will be Gatun Lake. The excavation of the spillway is about 300 ft. wide, but spreads out to about 500 ft. on the south or upstream side. Dimly discernible in the distance in Fig. C is a long trestle used in building the south toe. That part of it already completed on the left has closed up the old channel of the Chagres River, an eastern diversion canal and the old French canal, consequently the river has passed around to the right, back of the bank of earth seen upon that side. The north toe when finished will completely cut off the river, which will then find an outlet through the spill-

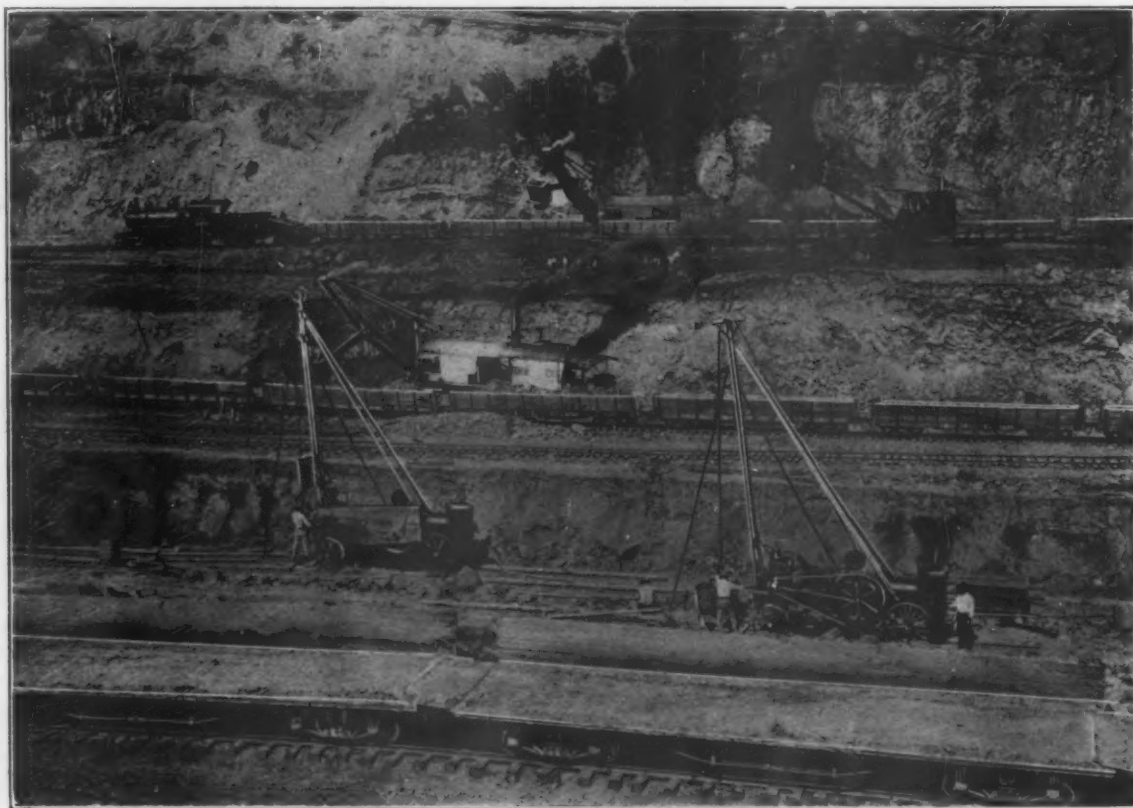


Fig. 3.—Excavating in Culebra Cut, Showing the Three Levels on Which Work Is Carried on Simultaneously.

narrow the dam could be shorter and more cheaply constructed. The control of the Cragres River, subject to sudden and enormous floods, introduced a complication. The great advantage of the Gatun location is that the lake, which will lie to the south of the dam, will only rise slightly when there is a heavy rainfall.

The dam will be constructed of clay and sand (about 18,000,000 cu. ft.). One reason why masonry will not be used is that in the event of a war it would be easier to destroy a stone wall dam than an earthen one 1200 ft. thick at the base, and be quicker accomplished, giving less opportunity for rescue. A masonry dam, moreover, would have steep sides, and with an enormous pressure of water on one side an earthquake might overthrow it.

At about the center of the dam site is a hill through which the spillway passes to afford an outlet for surplus water in Lake Gatun. By digging a channel through the hill to sea level the Chagres River may be diverted into it, thus unwatering the site during construction of the dam. This spillway is to be 284 ft. wide and 1200 ft. long, and lined with concrete, for which about 250,000 cu. yd. will be required. The river will not be diverted

way. The floor of the spillway is to be 4 ft. thick and the walls 20 ft. high, 8 ft. thick at the bottom, decreasing by steps on the outside to 3 ft. thick at the top. The inner faces of the walls will have a batter of 1 in 10. The eastern section of the dam is now being constructed, and the remaining section, to the right of the spillway, as seen in Fig. C, cannot be built until the river has been diverted. A concrete dam will likely be built across the channel, when the work on the dam to either side has risen to a height sufficient to withstand 50 or 55 ft. of water, to impound water in the Chagres Valley and enable the dredges to work to better advantage.

Such a dam as the one described could not be bodily displaced by the water back of it because of its great weight. The only real menace is the opening of a channel through the dam by some live though small stream of water. Such a current might form if there were a pipe line running through the dam below the water line or if an animal should burrow through. However, no pipe is to be put in and no animals burrow the hundreds of feet necessary.

The material for the dam will be deposited hydrau-



Fig. A. Panoramic View in the Culebra Cut, Looking North at the Left and South



Fig. B. North End of the Spillway from About the Middle.



Fig. D.

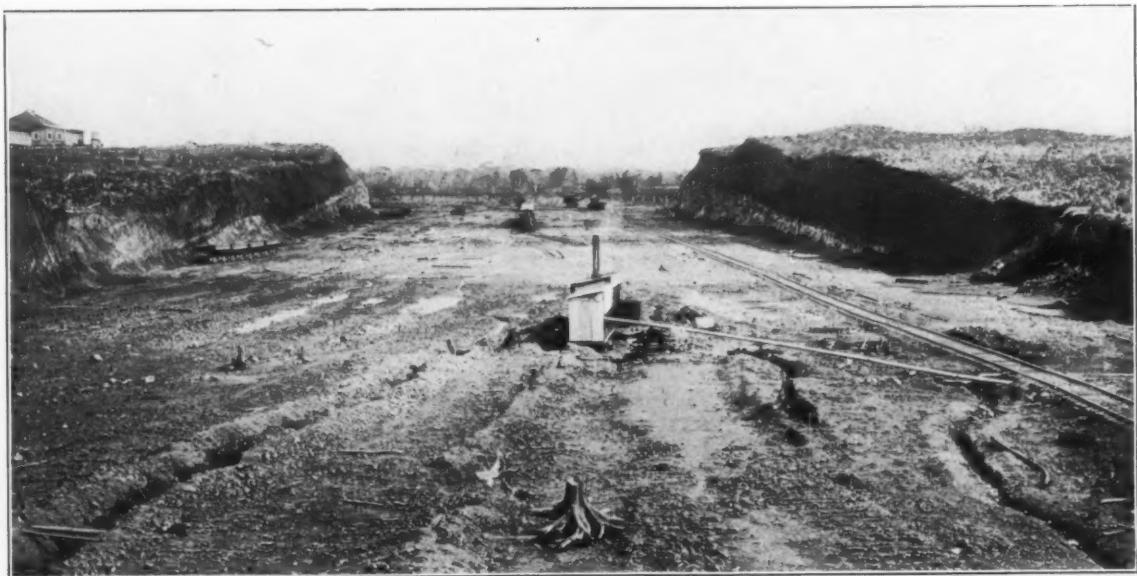


Fig. C. South End of the Spillway from Near the Same Point.

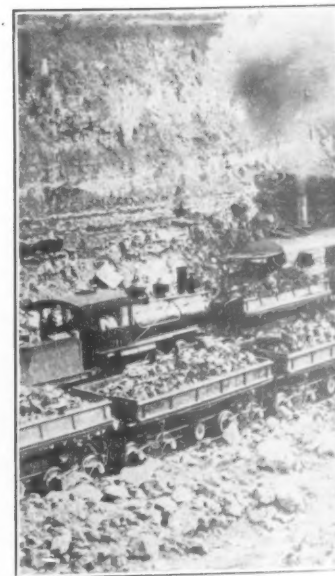


Fig. E.



Cut, Looking North at the Left and South at the Right, Rio Grande Slide in the Foreground, Gold Hill in the Cent



Fig. D. Ingersoll-Rand Rock Drills at Work Near Empire.

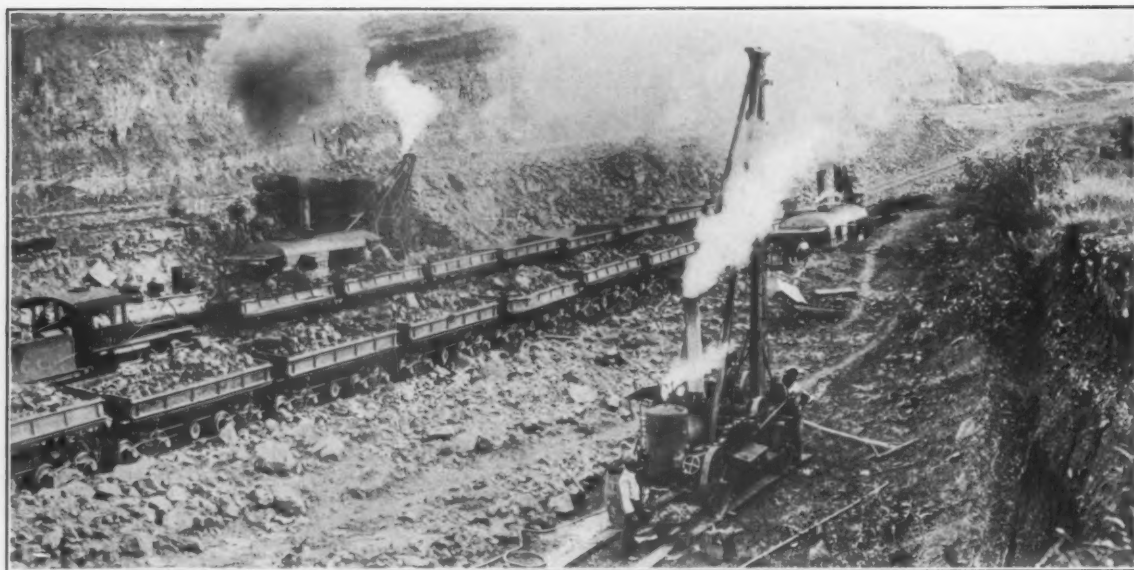


Fig. E. Excavating for the Gatun Locks, Looking South.

EXCAVATION IN PROGRESS FOR THE PAN



Center and Contractors Hill at the Extreme Right.



Fig. F. Excavating for the North Miraflores Lock, Looking North.



Fig. G. Excavating in the Culebra Cut, Looking North.



Fig. H. Car Carrying the Lidgerwood Winding Drum and Engine



Fig. I. Making Ready to Attach the Plow



Fig. J. Unwinding the Plow Rope



Fig. K. Leveling the Unloaded Material

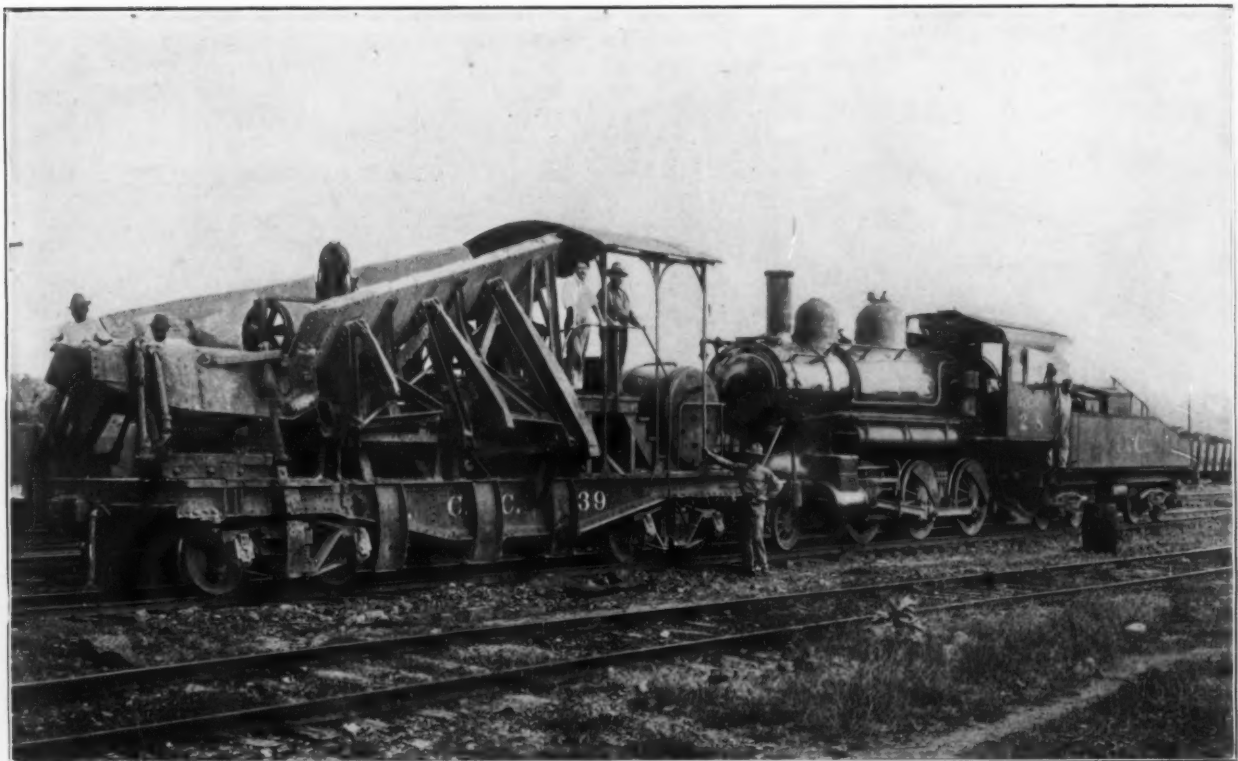


Fig. L. The Spreader Folded Up for Transporting

ERY USED IN DISPOSING OF THE EXCAVATE



Fig. M. The Plow Unloading the Train



Fig. N. Another View of the Spreader in Action

D MATERIAL

lically between the two rock toes by pipe line dredges and the water allowed to drain off. The body of the dam will contain upward of 21,800,000 cu. yd. of material, which two dredges, it is thought, can deposit at the rate of 10,000,000 cu. yd. a year.

Exploratory holes have been sunk to ascertain the character of the foundation underneath the dam. For this purpose the Sullivan diamond drill or the Ingersoll-Rand chilled shot drill are peculiarly suited, as they not only bore a hole but bring up a sample of the material. Several different varieties of drills are used in the Canal Zone also for drilling for blasts. Fig. D shows a cluster of Ingersoll-Rand drills which are supplied with compressed air from an installation of Ingersoll-Rand compressors, shown in Fig. 2. The Laidlaw-Dunn-Gordon Company has also furnished compressors.

The Experimental Dams.

So much depends upon the stability of Gatun dam that extensive experiments have been made on the behavior of masses of material under conditions similar to those which will exist in the structure itself. Earthen dams are not new and there have been comparable

water to enter the pipes and rise in the gauges. The height of water in the gauge showed the height of saturation. At the downstream end of the tank a partition was arranged, perforated with $\frac{1}{2}$ -in. holes, covered with netting, through which water might drain from the downstream face of the experimental dam into a measuring tank. At the upstream end of the tank a constant head of water was maintained against the dam of 85 in., corresponding to 85 ft. of the Gatun Dam. The height of water in the gauge glasses showed the levels of saturation at intervals of 4 ft., and the measuring tank the rate of percolation. The line of saturation was found to be fairly constant from day to day and declined to about 20 in. from the bottom of the tank at the downstream end. The amount of seepage through the dam remained constant.

The second type of construction was found to be much the more desirable so far as convenience in building was concerned. No difficulty was encountered in retaining the slope on the downstream side. This type was also less permeable, relatively, on account of the increased retention of the finer material. In the first type, while the very fine material could be placed at the up-

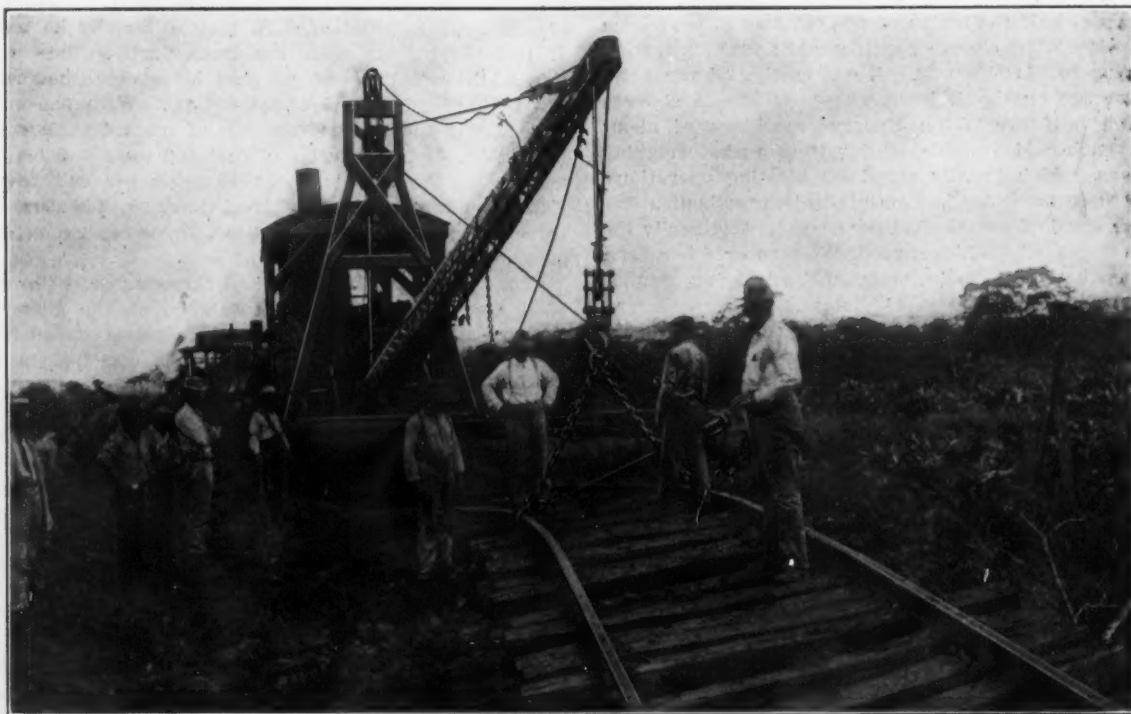


Fig. 4.—The Bierd Track Raising and Shifting Machine at Tabernilla Dump.

precedents, but the dam at Gatun will have to be constructed of earth from the immediate vicinity of the site.

A wood tank was constructed to correspond in form to a transverse slice of the dam on a scale of 1 in. to the foot. As it was unnecessary to reproduce the entire downstream slope, the tank was shortened 25 ft., leaving it 75 ft. long, and it was about 6 ft. wide inside, so that it represented 885 ft. of Gatun dam from the upstream toe and a section 72 ft. thick.

When hydraulic fills are made the finest particles settle farthest from the point of discharge. In one experiment the material was all pumped from the downstream direction, and in the other from both up and downstream. According to the first, the dam would have the finest material on the upstream slope and the coarsest on the downstream slope, and according to the other there would be coarse material on both slopes, with a central core of fine particles. As it is the fine, close grained material which stems the flow of water, it was simply a question of reducing the permeation more or less gradually. To measure the permeation $1\frac{1}{2}$ -in. pipes perforated with $\frac{1}{4}$ -in. holes were placed transversely about 4 ft. apart, with their ends projecting through the sides. One end of each pipe was capped, while the other was connected with a vertical glass gauge extending to the top of the tank. Wire gauze surrounded with gravel covered the pipe perforations, excluding sand but permitting

stream face, it was difficult to keep it there. All in all the second type seems so much more favorable that it will doubtless be followed in the full sized dam.

About 25,000,000 cu. yd. of suitable material for the fill has been located in the valley of the Chagres to the north of the site, and about 8,000,000 cu. yd. to the south. As considerable is lost in making such a fill, it may be necessary to make use of other large deposits of material nearby, but it is not anticipated that the 20,000,000 cu. yd. required for the dam will exhaust the available supply.

The Locks.

Excavation for the three double locks at Gatun is now going on. It will total about 5,000,000 cu. yd., as it is essential to go down to bedrock to secure a sufficiently stable foundation. More than half of this work was done on Jan. 1, 1909, up to which time steam shovels were used. Now dredging has begun upon the pair of lower locks, the dredge coming in from the Atlantic side. It is one of the great 20-in. suction machines and has 400,000 cu. yd. to remove. In Fig. E is a view of the excavation going on in the upper part of the site of the Gatun locks, looking in the direction of the future Gatun lake. Fig. F gives a view of excavation in process on one of the locks corresponding to the Miraflores dam, looking north.

About 2,000,000 cu. yd. of concrete will enter

into the construction of these locks, for which about 2,250,000 barrels of cement will be used, which will be brought from New York by ship. The crushed stone and sand necessary is to come by barge from or near Porto Bello, 20-odd miles away. Lidgerwood cableways will carry the materials from the docks to the storage bins, from which they will be discharged by gravity into electric cars, to be conveyed to the mixers. Other cars will take the concrete to various convenient locations, from which it will be hoisted and finally delivered where wanted by cableways.

The Culebra Cut.

Another great feature of the canal work is Culebra Cut, which is about $9\frac{1}{2}$ miles long. The route here runs through what was a saddle between Gold Hill and Contractors' Hill, about 312 ft. above sea level. The canal is to have a minimum depth of 45 ft., so that with the surface 85 ft. above sea level the bottom would be 40 ft. above and the depth of excavation necessary 272 ft. The two French companies dug to a depth of 161 ft., leaving 111 ft. for the Americans, who are, moreover, building a wider canal. Through the entire cut the bottom width will be 300 ft., as authorized by the President. Originally about half the length of the cut was to have been 200 ft. wide. The change requires additional excavation amounting to 13,000,000 cu. yd. and costing \$1 per yard.

There are on the Isthmus about 100 steam shovels, of which half are 95-ton Bucyrus machines of about 83 hp. each and capable of handling rocks weighing $10\frac{1}{2}$ tons, which greatly simplifies blasting operations. One of these machines has maintained throughout a day the high speed of a cubic foot per second. Ordinarily the spoil is deposited on Lidgerwood, Western or other cars, which are hauled in trains, many to the dumping grounds at Tabernilla, about 14 miles distant.

In Figs. 3 and G may be seen work going on in the Culebra cut. It is interesting to note the advantage being taken of the possibility of carrying this on simultaneously upon different levels. In Fig. A is an extended view of Culebra cut at the point where the canal rounds Gold Hill. This hill is seen in the center. On the extreme right may be seen one edge of Contractors' Hill. The original plan was to narrow the channel here on account of the immense labor of excavation, but recently it was decided to maintain the full width of 500 ft. here, as used elsewhere.

The Tabernilla Dump.

The great dump at Tabernilla is one solution of the problem of disposing of the excavated material. It now contains about 7 miles of tracks, on which trains of spoil come in from the cut. Their locomotives disconnect and return with a train of empties, while the loaded train is taken in charge by a local engine which hauls it into position near the edge of the dump. Just back of the locomotive is a car carrying the Lidgerwood winding apparatus for a long steel cable running the whole length of the loaded train and there attached to a plow. The winding engine takes steam from the locomotive. The cars have no end boards and but one side, and the plow is drawn through the entire train, plowing the rocks and earth off to one side. Aprons between the cars give the whole train a continuous floor upon which the spoil is placed. Five unloaders during the month of December (1908) unloaded 1367 trains, or 23,249 cars. This is an average of 273.4 trains, or 4650 cars for each apparatus—that is, each unloader swept the spoil from nearly 11 trains per day. Clearing a train of its contents is accomplished in a very few minutes, as actual operation goes on but a small part of the time.

In Figs. H, I, J and M are shown views of the Lidgerwood unloader. The manner of unloading varies somewhat according to the conditions, but the following is typical: The train of loaded cars is run to a point where two uprights are located at either side of the track, as shown in Fig. J, and the cable is connected to a chain stretched between the uprights. The locomotive now moves forward, the cable being allowed to unwind as it proceeds. This is continued until the position shown in Fig. I is reached. The cable is now made fast to the

plow, which is carried on a separate car, and wound up on the drum at the forward end of the train, pulling the plow through the train, as in Fig. M. Fig. H shows conditions at the other end of the cable, while the unloading operation is going on.

The rocks and earth shoveled off by the unloading apparatus ordinarily form a long pile adjoining one side of the track, to dispose of which a spreader or leveler is used. This apparatus, operated by a locomotive, pushes the long heap of spoil off from the track. In Fig. L is a view of one of the spreaders collapsed for transportation, and in Figs. S, K and N is seen a spreader engaged in the operation of leveling the mound of spoil left by an unloader.

This unloading and leveling cannot go on for a long time with a given position of the track, the reach of the spreader being limited. To change the location of the tracks quickly the track shifter, shown in Fig. 4, was designed by W. G. Bierd, general manager of the Panama Railroad. Without detaching the rails from the ties or disconnecting the rail lengths, this machine lifts a section of the track at a time clear of the ballast and then moves it laterally as much as it will bend without breaking. It has been found where 15 ft. is lifted at once a lateral thrust of 4 ft. may ordinarily be made. If it is desired to shift the track further than 4 ft. this additional displacement may be accomplished without lifting, and 4 to 5 ft. at a time. With one outfit nine men can shift over one mile of track 4 ft. laterally in an 8-hr. day. Exclusive of fuel and wear and tear on machinery, the cost is about 15 cents per rail length. Using ordinary methods of track shifting, 250 men and three foremen would be required, involving an expense of about \$2.55 per rail length.

The apparatus for lifting and throwing is at the rear of the machine, which moves forward on the unshifted portion between each operation. Two booms extend from the rear of the car, one of which is attached to the lower end of a mast, erected over the rear truck, and has its outer end connected by a 1-in. steel cable with the upper end of the mast. The mast is guyed by stays running forward. A block and tackle depend from the outer end of the boom. The cable operating the block runs over a pulley at the top of the mast and extends forward and down to a hoisting drum located toward the front of the car. A chain sling is attached to the block with hooks to engage under the heads of the rails. When the hoisting cable is operated the track may be bodily lifted from the ballast. The second boom is arranged much as the first, except that it is guyed horizontally. A $\frac{3}{4}$ -in. steel cable runs from a second drum over a couple of guide pulleys out to a pulley at the outer end of this boom, where a hook is attached to it. This, upon being arranged against the head of the inner rail (relatively to the shifting curve), shifts the track laterally when operated by the drum. This is the method of track shifting employed at Tabernilla dump and elsewhere in the Canal Zone, and has been found of especial service in relocating the Panama Railroad, made necessary by the construction of the canal. Where the lateral shifting desired amounts to considerable the apparatus is repeatedly run over the partially shifted track.

(To be continued.)

The Youngstown Car Mfg. Company, Youngstown, Ohio, reports the following recent contracts: La Belle Iron Works, Steubenville, Ohio, 40 open hearth charging boxes; Brooklyn and Mare Island navy yards of United States Government, steel dump cars and four separate orders for steel mine cars for shipment to various bituminous coal operators. It is at present operating to 80 per cent. of capacity with good prospects.

The Meehan Boiler & Construction Company, Lowellville, Ohio, has received a contract from the La Belle Iron Works, Steubenville, for riveted steel pipe required in conducting gas from the blast furnaces to the boiler house. The Meehan Company is also rushing repairs on Mary Furnace of the Ohio Iron & Steel Company, Lowellville.

The Cleveland Horizontal Boring Machine.

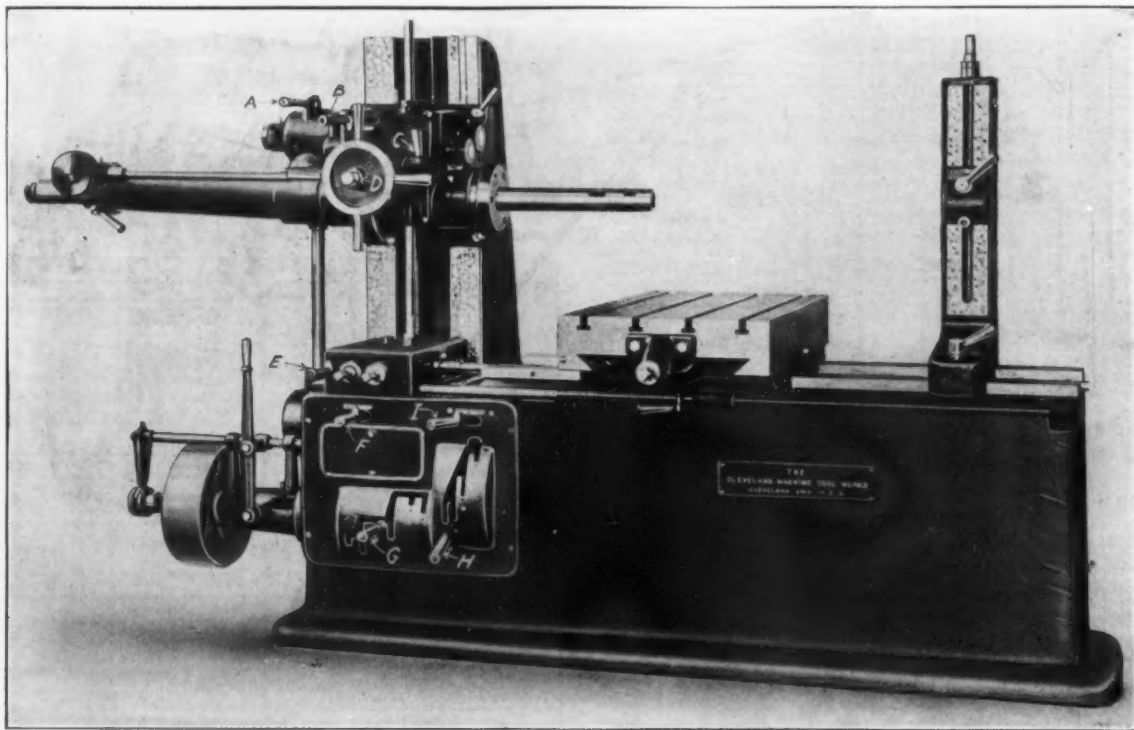
The Cleveland Machine Tool Works, Cleveland, Ohio, was recently organized to place on the market the No. 1 horizontal boring, milling and drilling machine with tapping attachment and vertical feed shown in the illustration. Aside from its simplicity in design, the principal feature of the machine is the convenience with which it may be operated, all of the handles being located where the operator can reach them from the normal working position. To make a complete change in either the speed or the feed only one handle is moved, and for slow hand feed and quick traverse of the bar the same pilot wheel is used. The deep box bed is constructed with special internal ribbing, which makes a foundation unnecessary. Two chutes within this bed convey the chips away.

The machine is driven by a 14-in. constant speed pulley that will take a 4-in. belt. This pulley runs at

and power quick traverse by manipulating the knob in the center of this wheel, which engages a clutch.

Power feed is provided for the platen longitudinally on the bed, for the boring bar longitudinally through the spindle, and for the spindle vertically on the housing. The lever for the vertical feed is shown at E. All feeds may be reversed through the lever F, and the changes of feed—16 in all—are obtained through the lever H, which gives four changes, in turn doubled by the feed multiplier lever I, and these eight again doubled when the spindle back gear is engaged. The feeds are positive geared and range in geometrical progression from 0.005 to 0.3 in. per revolution of the spindle.

The maximum vertical adjustment of the head on the column is 20 in., and the vernier adjustment of the head on the column is 18 in. The greatest distance from the face plate to the outboard support is 4½ ft. This outer support for the boring bar can be clamped securely to the bed, or it may be removed when the work on the



The No. 1 Horizontal Boring, Milling and Drilling Machine with Tapping Attachment and Vertical Feed, Built by the Cleveland Machine Tool Works, Cleveland, Ohio.

235 rev. per min. and gives six direct speeds obtained by manipulating the lever G, which range is doubled by manipulating the back gear through the lever B. The total range of spindle speeds is from 10 to 140 rev. per min. The gear ratio from the driving shaft to the spindle is 7 to 4, and the back gear ratio is 12 to 1. Stopping and starting of the machine is controlled by a clutch lever at the left end of the machine, so that a counter-shaft is not necessary.

Through bevel gears and a vertical shaft the drive is communicated to the spindle, which runs in solid taper bronze bearings adjustable for wear. The spindle has a face plate which is adapted to receive large milling cutters, &c., for heavy work. It revolves in either direction and can be started, stopped or reversed instantly through the lever A. This is convenient for facing, tapping, milling and like operations. The spindle and back gear drive is located between the spindle bearings, which brings the power direct to the work, thus relieving the outer shafts from unnecessary strain. All of the changes of speed as well as those of feed mentioned later on can be made while the machine is running without danger of interference. The spindle bar which passes through the spindle is of unannealed crucible steel 2½ in. diameter and has a 22-in. longitudinal traverse. The end is fitted with a No. 5 Morse taper socket. Power feed is obtainable in either direction or the bar can be clamped securely when performing face milling operations. Hand feed of the bar is obtained through the pilot wheel D,

platen overhangs. The spindle head and the outer support are aligned by means of a scale and vernier reading to 0.001 in. The scale reads directly to sixty-fourths and one-hundredths of an inch. The platen has four ⅝-in. T slots and a working surface of 20 x 36 in. Its cross traverse is 24 in. The platen and carriage adjustments are made with reference to micrometer dials. All gearing is of steel and encased. All bearings are bronze bushed and all bevel and miter gears are planed from the solid. All flat bearings are adjusted with taper gibs. On special order the machine may be furnished with the following attachments: revolving table, auxiliary table, boring bars and star feed facing head.

The McGraw-Hill Book Department.—The announcement is made that the book departments of the Hill Publishing Company and McGraw Publishing Company have been consolidated under the name of the McGraw-Hill Book Department, at 239 West Thirty-ninth street, New York. The new company has taken over all the books issued by both companies, embracing 250 titles, including works on electricity, mining, metallurgy, machinery and civil and mechanical engineering. The officers of the new company are: John A. Hill, president; James H. McGraw, vice-president; Edward Caldwell, treasurer, and Martin M. Foss, secretary.

The Tennessee Copper Company, Ducktown, Tenn., is to build a second and larger sulphuric acid plant.

An Electrically Driven Merchant Mill.*

Power Requirements for Rolling High-Carbon Steel of Small Section.

BY BRENT WILEY.

The tests in this paper were taken from a 9-in. merchant mill, a plan of which is shown in Fig. 1. The mill consists of seven stands of three-high rolls and one fin-

ishing stand of two-high rolls driven by a two-speed two-phase, 60-cycle, 2200-volt induction motor of squirrel-cage rotor construction, connected to the mill by means of a 42-in. three-ply belt. The ratings of the motor are

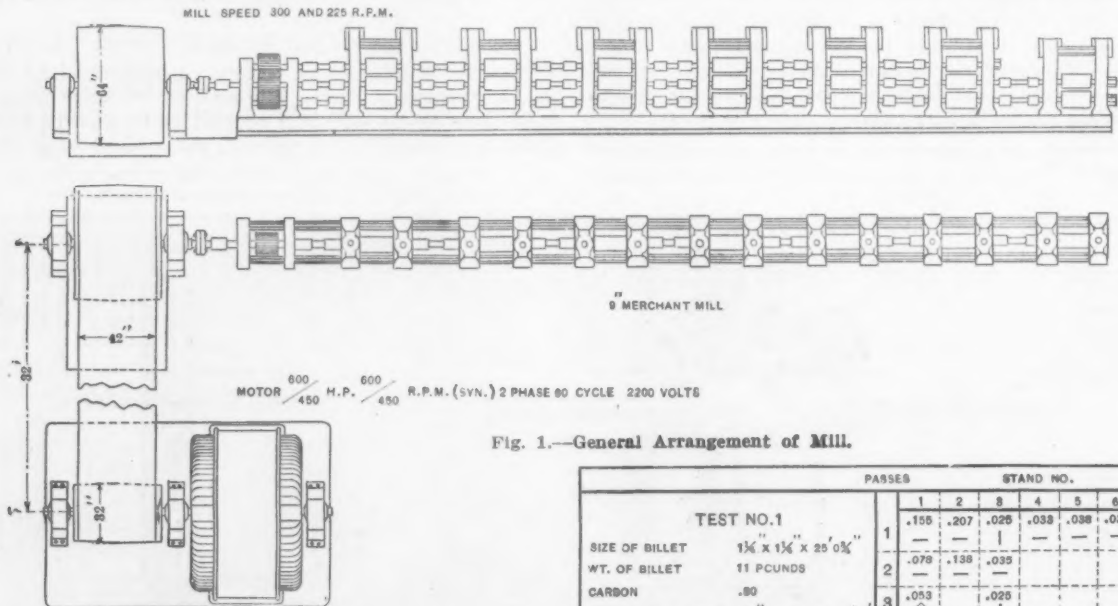


Fig. 1.—General Arrangement of Mill.

ishing stand of two-high rolls driven by a two-speed two-phase, 60-cycle, 2200-volt induction motor of squirrel-cage rotor construction, connected to the mill by means of a 42-in. three-ply belt. The ratings of the motor are

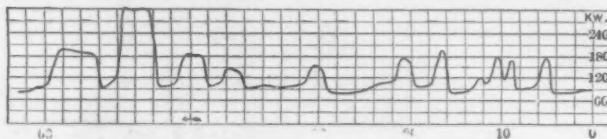


Fig. 2.—One Piece in Rolls, Test No. 1.

600 hp. at 600 rev. per min. (synchronous speed) and 450 hp. 450 rev. per min. The pulley reduction gives a mill speed of one-half these values.

The product of this mill is high carbon steel of com-

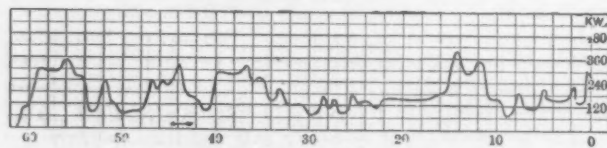


Fig. 3.—Rolling Conditions, Test No. 1.

paratively small section, test data being given for steel ranging from 0.80 to 1.29 carbon, and of section ranging from 1 3/16 in. by 1-32 to 5-16 in. round. Originally the intention was to run the mill on the slow speed for the

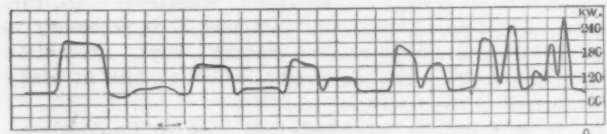


Fig. 4.—One Piece in Rolls, Test No. 2.

larger sections and on the high speed for the small rounds and very thin flats, but on testing the high speed

* A paper read at the 26th annual convention of the American Institute of Electrical Engineers, Frontenac, N. Y., June 30, 1909. The tests referred to were conducted under the supervision of C. J. Russell.

		PASSES						
		STAND NO.						
		1	2	3	4	5	6	7
TEST NO. 1								
SIZE OF BILLET	1 1/4" x 1 1/4" x 25' 0"	1	.155	.207	.026	.038	.038	.034
WT. OF BILLET	11 POUNDS	2	.078	.138	.035	—	—	—
CARBON	.80	3	.053	—	.026	—	—	—
SIZE OF FIN. STOCK	1 1/4" x 16 GAUGE x 48	4	.027	—	—	—	—	—
NOTE: POSITION OF PIECE IN ROLLS IS INDICATED BY SIGNS: — MEANS PIECE ON EDGE								
TEST NO. 2								
SIZE OF BILLET	1 1/4" x 1 1/4" x 78"	1	.1118	.425	.104	.0491	.051	.0492
WT. OF BILLET	32 POUNDS	2	.102	.283	.034	.034	.0416	—
CARBON	1.20	3	.0492	—	—	—	—	—
SIZE OF FIN. STOCK	1" x 3/16" x 47"	4	—	—	—	—	—	—
TEST NO. 3								
SIZE OF BILLET	1 1/4" x 1 1/4" x 78"	1	.335	.228	.147	.0710	.1018	.0329
WT. OF BILLET	32 POUNDS	2	—	.168	.1002	.0473	.048	—
CARBON	1.20	3	—	—	—	—	—	—
SIZE OF FIN. STOCK	1 3/16" x 3/16" x 34' 8"	4	—	—	—	—	—	—
TEST NO. 4								
SIZE OF BILLET	1 1/4" x 1 1/4" x 38"	1	—	—	—	—	—	—
WT. OF BILLET	18 POUNDS	2	—	—	—	—	—	—
CARBON	.80	3	—	—	—	—	—	—
SIZE OF FIN. STOCK	3/8" ROUND	4	—	—	—	—	—	—
TEST NO. 5								
SIZE OF BILLET	2 3/16" x 3/8" x 47"	1	—	—	.073	.098	.098	.0375
WT. OF BILLET	10 3/4 POUNDS	2	—	—	.305	—	—	.0312
CARBON	.80	3	—	—	.0278	—	—	—
SIZE OF FIN. STOCK	2" x .041" x 35"	4	—	—	.0491	—	—	—
* LOAD VERY LIGHT * STOCK AT BLACK HEAT, LEAVING PASS								
TEST NO. 6								
SIZE OF BILLET	1 1/4" x 1 1/4" x 9' 8"	1	.529	.3315	3/8" x 3/8"	.043	3/16" x 3/16"	.0206
WT. OF BILLET	80 POUNDS	2	.473	—	—	—	—	—
CARBON	.80	3	—	—	—	—	—	—
SIZE OF FIN. STOCK	5/16" ROUND x 198'	4	—	—	—	—	—	—
NOTE: * STARTED THREAD WHEN LEAVING 3RD PASS								
TEST NO. 7								
SIZE OF BILLET	1 1/4" x 1 1/4" x 9' 8"	1	.1087	.2480	.0517	.0517	.0545	—
WT. OF BILLET	26.8 POUNDS	2	.0595	.3130	.0295	.0498	—	—
CARBON	1.29	3	.0203	.0815	—	—	—	—
SIZE OF FIN. STOCK	1" x .193" x 38"	4	—	.1380	—	—	—	—
NOTE: * THESE TWO PASSES WERE IN SAME GROOVE * THESE TWO STANDS WERE UNCOUPLED								
TEST NO. 8								
SIZE OF BILLET	1 1/4" x 1 1/4" x 81"	1	—	—	—	—	—	—
WT. OF BILLET	24 3/8 POUNDS	2	—	—	—	—	—	—
CARBON	.85	3	—	—	—	—	—	—
SIZE OF FIN. STOCK	1 1/2" ROUND x 51' 8"	4	—	—	—	—	—	—
NOTE: * WAS THREADED FROM 3RD TO 4TH STANDS								

Table 1.—Data for the Eight Sets of Curves.

chiefly to the practically constant speed of the motor, as the average speed of the engine is appreciably reduced by the heavy load conditions.

It will be seen that the areas of the sections at each pass are only approximate, but the relative values, which are of more importance, give a good idea of the operating conditions and work done.

The recorded readings, as shown by the series of curves, were taken to obtain the power required per pass, the total power for one piece of stock, and the power requirements when the mill was in regular operation with several pieces of stock in the rolls at one time.

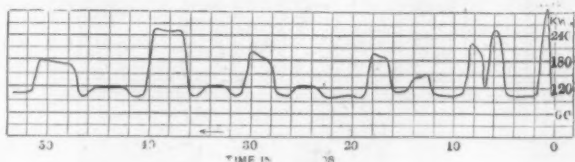


Fig. 5.—One Piece in Rolls, Test No. 3.

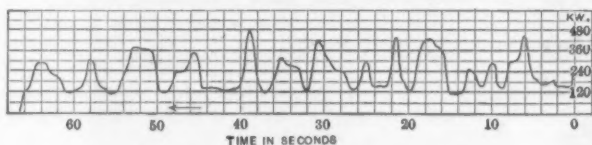


Fig. 6.—Rolling Conditions, Test No. 3.

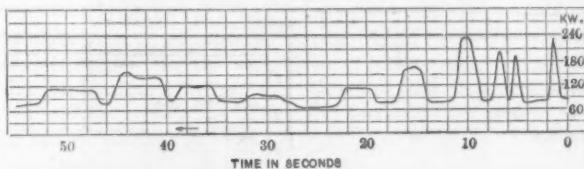


Fig. 7.—One Piece in Rolls, Test No. 4.

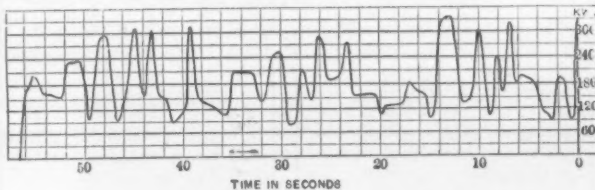


Fig. 8.—Rolling Conditions, Test No. 4.

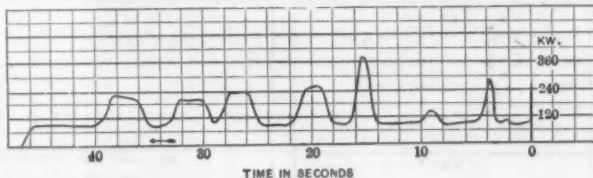


Fig. 9.—One Piece in Rolls, Test No. 5.

These latter data were, however, not obtained for tests Nos. 2 and 6.

An all-day record was kept during test No. 7. The results give a good idea of the capacity and the average power requirements per ton of product. The following is the record from 6.55 a.m. to 3.49 p.m.:

Size of stock rolled.....	1 in. by 0.193 in. by 36 ft. 0 in.
Carbon.....	1.29
Size of billet.....	1.25 in. by 1.25 in. by 5 ft. 6 in.
Weight of billet.....	26.6 lb.
Number of billets rolled.....	1,121
Total weight of billets.....	29,818 lb.
Actual operating time.....	408 min.
Time lost.....	126 min.
Total kilowatt-hours.....	1,140
Kilowatt-hours friction load.....	408
Kilowatt-hours (including friction) per ton of metal rolled	71.2

Recorded readings shown in Figs. 12 and 13 were taken during the above run.

The flywheel effect of the system is practically limited to that of the rotor of the motor; this effect is comparatively small, as the slip of the motor is but 3 per cent. at full load. The efficiency of the motor is, therefore, kept as high as possible. By referring to Fig. 6 (test No. 3), it will be seen that the peakload conditions have a

duration of approximately 6 sec. To equalize this load to the average power would require an excessively large flywheel on the mill shaft, and the slip of the motor would have to be increased approximately three times the present value, thereby lowering the efficiency of the motor.

From the average working conditions as estimated from the various power curves for usual mill operation, it would require approximately a 15-ton flywheel 8 ft. in diameter, with a 10 per cent. drop in speed for 250 hp. increase of load in order to lower appreciably the peak values of the load. The time and efficiency costs of this

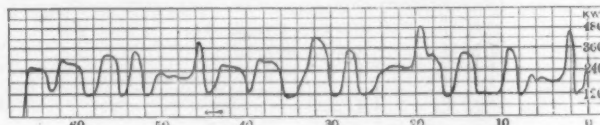


Fig. 10.—Rolling Conditions, Test No. 5.

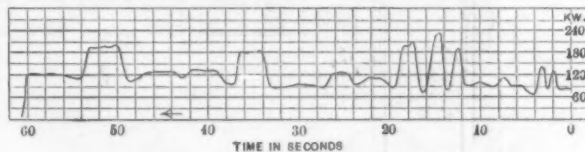


Fig. 11.—One Piece in Rolls, Test No. 6.

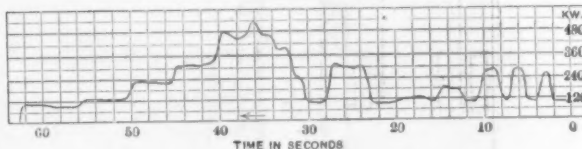


Fig. 12.—One Piece in Rolls, Test No. 7.

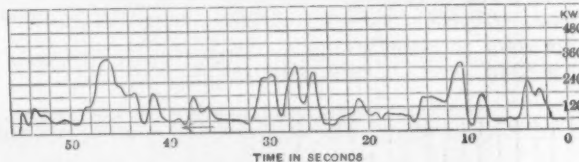


Fig. 13.—Rolling Conditions, Test No. 7.

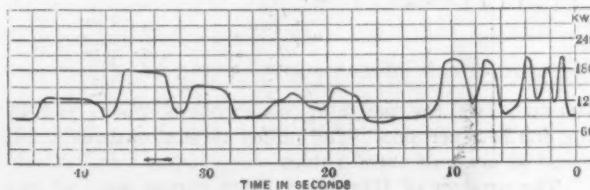


Fig. 14.—One Piece in Rolls, Test No. 8.

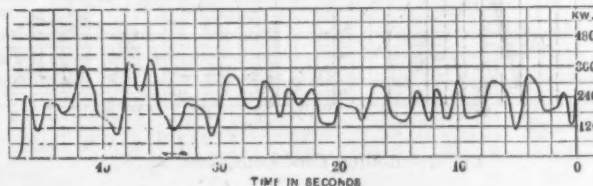


Fig. 15.—Rolling Conditions, Test No. 8.

equalization do not warrant the use of a flywheel in the system.

The friction load of the mill is somewhat high, this being due principally to the fact that it is necessary to keep the mill adjusted very closely. Every precaution is taken to keep the mill tight, which results in heavy pressures in the bearings.

It is generally supposed that, due to its hardness, more power is required to roll the high carbon steel than the ordinary mill steel, but at the same temperatures the energy required is practically the same. Owing to the high percentage of carbon the harder steel billet must not be heated as hot as the milder steel, and it is therefore rolled at a lower temperature, the lighter sections being finished at a black heat.

Electrical Equipment in the Mesta Pattern Shop.

In the works of the Mesta Machine Company, West Homestead, Pa., two floors of a reinforced concrete build-

used in making the patterns required for the large engines and rolling mill machinery manufactured by this company.

The accompanying two views in the shop show in a general way the disposition of the equipment. In Fig. 1 patterns of various kinds may be seen in different states



Fig. 1.—General View in the Pattern Shop (Second Floor) of the Mesta Machine Company, West Homestead, Pa.



Fig. 2.—Another View in the Pattern Shop, Showing a Number of Wood Working Machines Driven by Westinghouse Motors.

ing are devoted exclusively to the pattern shop. The natural light is excellent, the machines are all driven by individual motors, so that there are no overhead belts, and the wiring is entirely concealed, making the general appearance of the shop particularly clean and attractive. The shop is equipped throughout with new machinery

of completion, while in Fig. 2 the shop floor is shown cleared of work. The equipment includes three bench saws, three band saws, a swing saw, three surfacers, three jointers, three lathes, a pony planer and a pattern scroll saw. The motors for the most part are belted to the machines, but in a few cases, as with the two-speed

lathes, they are directly connected. The planer and the surfacers are driven by a countershaft to which the motor is directly connected. The motor for the scroll pattern saw is directly coupled to the crank wheel, providing a most compact equipment.

The capacities of the motors and the machines to which they are connected are given in full in the following table:

Pattern Shop Installation.			Motor.	
Machine.	Size.		H. P.	Speed.
Type and make.				
Cut-off saw, Oliver.....No. 60	14"		5	1,600
Cut-off saw, Oliver.....No. 60	14"		5	1,600
Rip saw, Oliver.....No. 60	14"		5	1,600
Surfacer, Oliver.....No. 61			5	1,600
Surfacer, Oliver.....	24" x 9'		5	1,600
Jointer, Oliver.....B	20"		5	1,600
Jointer, Oliver.....B	20"		5	1,600
Jointer, Oliver.....	24"		5	1,600
Lathe, Oliver.....B	30"		5½	450-1,350
Speed lathe, Oliver.....	12"		¾	500-1,500
Speed lathe, Oliver.....No. 24	20"		2	500-1,500
Bank saws, Oliver.....	36"		3½	1,050
Bank saws, Oliver.....	36"		3½	1,050
Bank saws, Oliver.....	36"		3½	1,050
Bank saws, Oliver.....	36"		3½	1,050
Swing saw, Oliver.....B No. 36			3½	1,050
Pattern scroll saw, Oliver..No. 1			¾	*700
Pony planer, Fay & Egan..	24"		5	1,600
Surfacer, Towsley Mfg. Co.			5	1,600
Saw filer, Black Diamond				
Machine Works.....				
Knife grinder, Oliver.....	6" x 40"		3½	†1,050

* Direct connected. † Group drive.

It will be noticed that motors of 3½ or 5 hp. predominate. Purposely as few sizes as possible were used to minimize the repair parts carried in stock. These 5-hp. motors, running at 1600 rev. per min. and the 3½-hp. motors running at 1050 rev. per min. are built on the same frame, and all parts except armatures and field windings are interchangeable. Spare armatures and field coils of each type are kept on hand. All of the motors are of direct current 220-volt shunt wound type. To prevent damage to the commutator by the accumulation of dust and dirt, the electrical superintendent, F. G. Galbraith, has devised a neat wire covering which affords ample ventilation and yet prevents shavings, &c., from getting inside the motor. Protection to the belts from dirt, &c., and to the operator in case of a broken belt is afforded by a special steel guard which is fastened to the floor and to the motor frame, and completely incloses the belt. This device, made by the Mesta Machine Company for this purpose, may be seen in the illustrations.

The wiring is all carried in an 8-in. conduit in the floor, which runs the full length of the shop, with outlets at each machine. This conduit is packed with kiln dried silica sand which prevents possibility of arcing or fires. The switchboard is in a separate room, where the saw filing and knife grinding is done by an automatic filing machine, which is arranged so that the band saws may be loosely looped over an old band saw wheel.

In addition to the equipment mentioned in the table, there are nine glue pots, electrically heated, where all the glue is warmed. Practically the entire motor equipment, together with the glue pots, was supplied by the Westinghouse Electric & Mfg. Company.

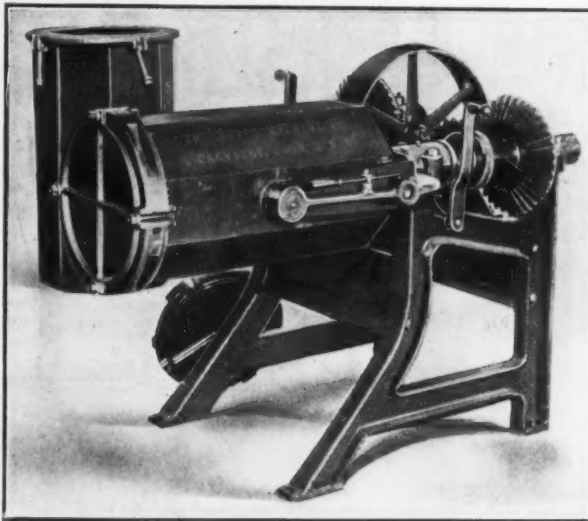
A Notable Municipal Report.—A municipal report of more than ordinary interest is about to be issued by the city of Boston in the shape of a volume of over 1200 pages, comprising nearly 60 individual reports made by Metcalf & Eddy, consulting civil engineers, of Boston, to the efficient Finance Committee, which recently completed its labors. In the course of this investigation the engineers studied deeply into the conditions of certain departments, particularly those of water and sewers, and made practical and far reaching recommendations. Much detailed information of value is given regarding costs of construction and maintenance, the relative merits of contract and day work are sanely discussed, and the effects of age and term of service upon the efficiency of day labor are shown by numerous tables. Although relating principally to conditions in the city of Boston, the report also presents for comparison tabulated facts regarding different cities throughout the country. This volume reports the work of experienced experts in a way

to suggest the applicability of the results and conclusions to other municipalities. The edition authorized by the city is stated to be so limited that practically no copies will be available for general distribution.

The Baird Double Tilting Tumbling Barrel.

The No. 1 double horizontal tilting tumbling barrel, an addition to the line of equipment made by the Baird Machine Company, Oakville, Conn., is for polishing small machine parts, flat metal and stamped articles of all kinds. The articles are tumbled in the machine along with steel balls, which burnishes them before plating or polishes them afterward, and for such work has proved very effective. In its manner of doing the work it is similar to older of this company's designs, but in its form of construction and arrangement it is new. The simplicity of operation of the machine and the rapidity with which it can be handled are its two important features.

The barrels are of cast iron, lined with maple wood, which itself is quite durable, but which when worn out can be easily replaced, thus preserving the iron barrel. Near the center of their length the barrels are pivoted and are rigidly held in the forked shaped support in the horizontal operating position by a lock pin which en-



The No. 1 Double Horizontal Tilting Tumbling Barrel, Made by the Baird Machine Company, Oakville, Conn.

gages a recess on one side of the barrel near the bottom end. A slight push on the lock pin lever shown instantly disengages the pin, when the barrel can be tilted. Simply loosening the cover bolt nuts and throwing them back allows the cover to be removed, and the barrel can then be instantly tilted or turned up to dump the articles, then reversed and refilled. The entire operation takes but one or two minutes. As the cover bolts are hinged to the barrel itself and the nuts have only to be loosened, not taken off, when removing the cover there are no parts to get lost. Each barrel is driven independently by a clutch engaging the large gear, so that one barrel can be emptied and refilled while the other is in motion. A rubber gasket on the cover completely seals the barrel, making it water tight.

The barrel inside is 10½ in. diameter by 24 in. long, the clutch pulley is 20 in. diameter by 4 in. face, the speed of the clutch pulley is from 120 to 140 rev. per min., the speed of the barrels is from 60 to 70 rev. per min., the ratio of gearing is 2 to 1, the floor space 46 x 57 in., and the net weight 1300 lb. At present this type of machine is made and carried in stock only in the above size, but other sizes as well as special barrels will be made to order.

The Portsmouth Steel Company, Portsmouth, Ohio, is making an addition 120 ft. long to its plate mill building, and an addition 170 ft. long to its bar mill building. No new equipment will be needed except a few punches and shears.

The Peerless Automatic Multi-Spindle Screw Machine.

In *The Iron Age*, December 3, 1908, there appeared a description of an automatic multi-spindle lathe or screw machine built by the Peerless Automatic Machine Company, Cleveland, Ohio. The machine here described

mechanism, receive power from a single pulley running at high constant speed. The pulley is shown clearly at the left end of Fig. 2. Power is transmitted through reducing gearing to a constant speed shaft, shown in the center of Fig. 3 in horizontal alignment with the pulley bearing shaft, and from there through change gears to the spindle driving shaft running through the center of the tool slide and spindle head. A set of change gears

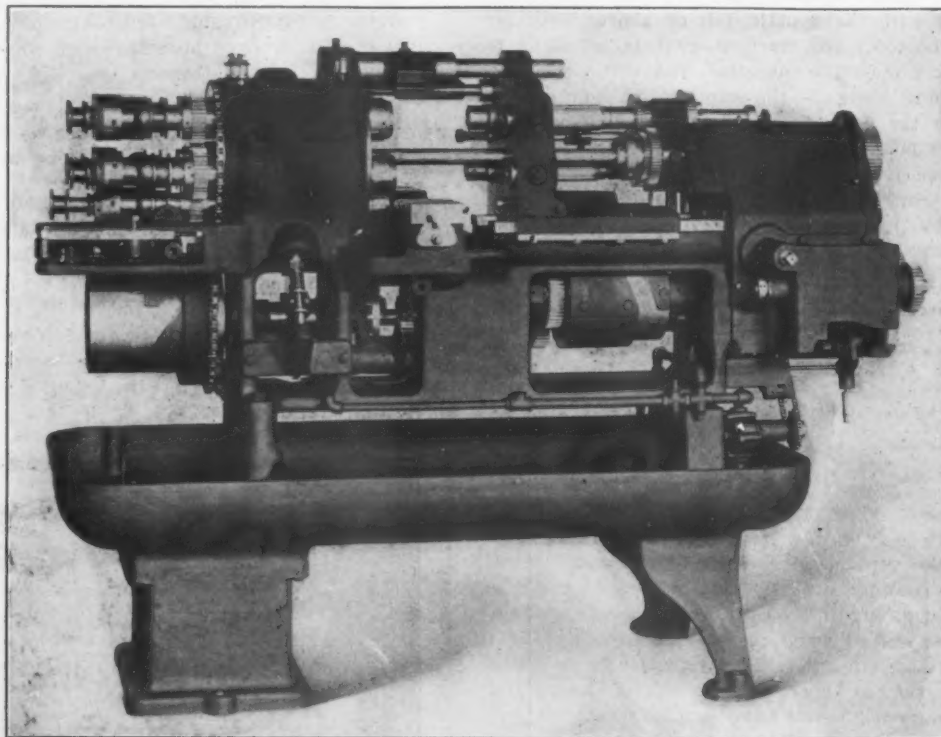


Fig. 1.—The Improved Automatic Multi-Spindle Screw Machine Built by the Peerless Automatic Machine Company, Cleveland, Ohio.

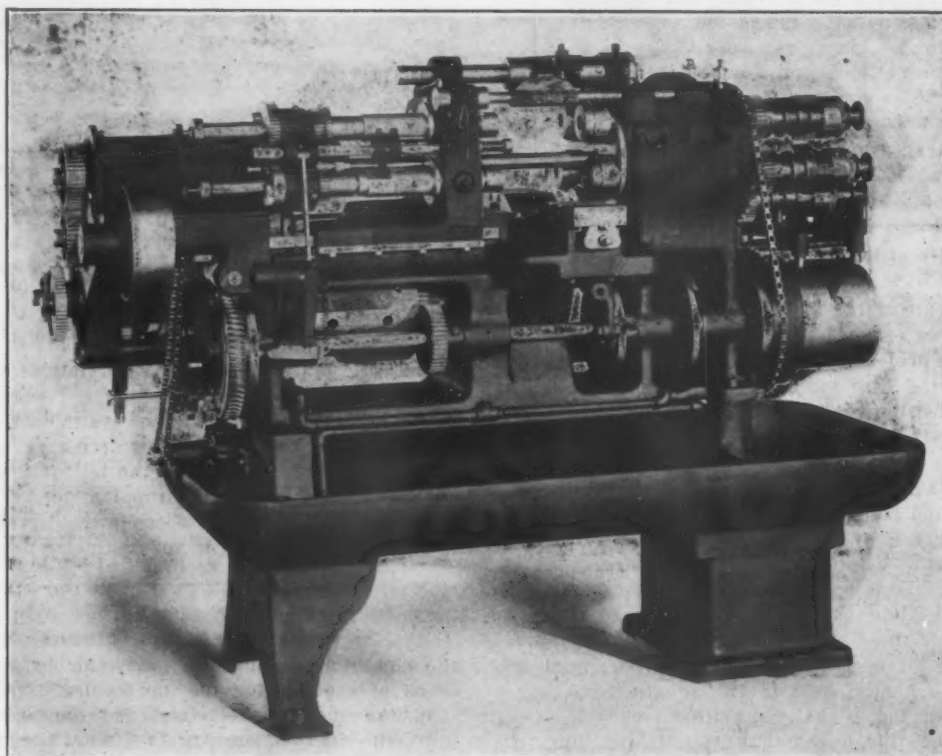


Fig. 2.—A Rear View of the Peerless Automatic Screw Machine.

follows closely the design of the earlier machine, but, being intended for a more general run of work, embodies a number of new features.

Fig. 1 shows the front side, Fig. 2 the rear side and Fig. 3 the tail end of the machine. In these views the gear guards are removed to expose the mechanism. The stock spindles, as well as the automatic operating

afford means of obtaining the speed most suitable for the work to be done and the material and tools to be used. An oil pump is driven by sprockets and chain from the pulley shaft.

When the tools are active—that is, operating upon the material—the cam mechanism is driven from the spindle driving shaft through the quick change gear

mechanism shown at the extreme right of Fig. 1. This mechanism gives five changes of feed for the tools, and by interchanging the two gears, shown in horizontal alignment at the left of Fig. 3, five more feeds are obtained. An extra set of two gears furnished give 10 more feeds in the same manner, thus making a total of 20 feeds, ranging from 0.003 to 0.024 in. per revolution of the spindle. These feeds always bear a definite relation to the spindle speeds, since the feed mechanism is intergeared with the spindle driving shaft.

When the tools are inactive—that is, when no tools are operating upon the material, and while the spindle head is being indexed—the cam mechanism is driven direct from the constant speed shaft. The machine is thus always performing its idle movements at the same speed irrespective of the spindle speeds. The cam mechanism can be instantly disengaged and locked out of action by pushing forward the knob, located below the feed box, shown in Fig. 2, during either the active or

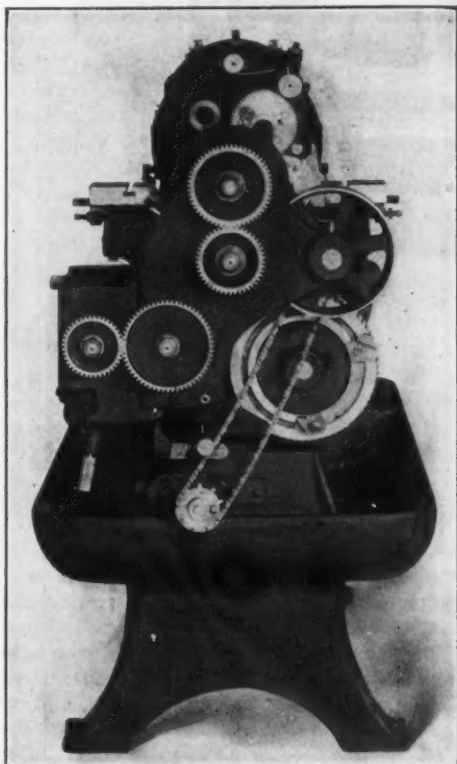


Fig. 3.—A View of the Tail End of the Peerless Screw Machine.

idle movements of the machine, which can then be hand operated by a crank handle placed on the squared end of the shaft projecting from the feed box, shown in Fig. 1. To set the cam mechanism into motion again this knob is pulled outward, thus causing the proper feed to be started. It is impossible to start the fast feed when the tools are in their operating position or to start the slow feed when the tools are in their idle position. The changes to and from the active and idle feeds or motions are accomplished by the adjustable cam dogs secured to the face of the worm wheel shown in Fig. 3.

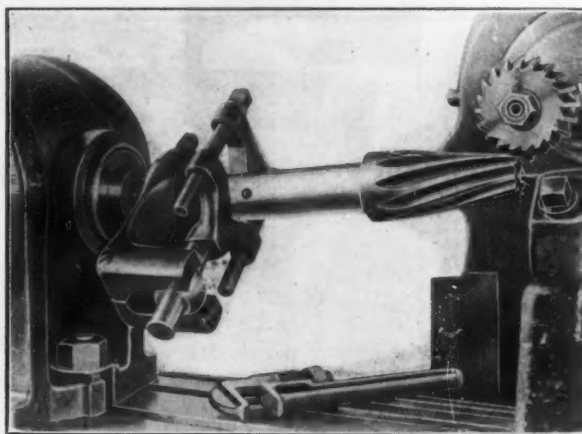
This machine is built with a knee type longitudinally moving tool slide carrying four tools and the stock stop. Two of these tools may be threading tools, either taps or dies, or one of each. An auxiliary tool holder journaled on a stud held in the spindle head cap and having its bearing in the longitudinal tool slide, operates in either the third or fourth spindle position. It is oscillated to the work by a cam adjustably carried by a rod fastened to and moving with the longitudinal tool slide. A spring returns the auxiliary tool holder to its normal position. The tool holder and operating cam are plainly shown in Figs. 1 and 2.

The operation of the longitudinal tool slides, the threading spindles, the transversely moving tool slides, the spindle head locking and indexing mechanism, the stock feeding and chucking mechanism and the general construction of the stock spindles and the spindle carry-

ing head are nearly identical with those of the automatic lathe previously described in these columns and need no further explanation.

The New Hill Milling Machine Dog.

An improved milling machine dog, made by the M. B. Hill Mfg. Company, Worcester, Mass., contains new features by means of which operations in milling work on centers are much simplified. The device consists of a driver with grooved jaws in which slides a dog, the tail of the dog passing through the ball and moving up or down as the work varies in diameter. The ball and tail are hardened and ground and lapped to a fit. It will be noticed that the groove in which the ball moves—in other words, the driving contact—is always parallel to the axis of the work and head spindle, and consequently the spacing will be practically correct on taper work, which is not possible with the common use of the ordinary dog. A rectangular taper can be indexed by simply raising or lowering the head center. After the dog is in position on the centers no further attention is required. The attach-



A New Dog for Use on Milling Machines Made by the M. B. Hill Mfg. Company, Worcester, Mass.

ment permits of work being taken from the centers before completion.

The dog is always held rigidly in the driver, while at the same time it can move as required. Being automatic in its action, difficult work may be performed by comparatively unskilled operators. The driver is split at the bottom, so that the tension on the ball may be varied at will by means of a screw, as shown. A three-point contact on the work eliminates any tendency to twist in the driver. The dog takes any work from $\frac{1}{4}$ in. to 2 in. diameter.

When using an ordinary lathe dog in the milling machine there is a tendency of the dog to work loose or to cramp in the driver, springing the work, which throws undue strain on the centers. As the set screw is always in one place it is sometimes necessary to use a shim to have the screw bear upon the tail of the dog, and there is danger of the shim dropping out. The necessity of leaving the dog slightly loose in the driver on taper work, especially on spirals, is not conducive to perfect work.

The William B. Scaife & Sons Company, Pittsburgh, Pa., has completed an addition to its plant at Oakmont, Pa., to accommodate its increased business in the building of systems for the purification of water for steam boilers and for industrial and domestic uses. Among recent orders taken are the following: American Sheet & Tin Plate Company, Vandergrift, Pa. (twentieth order), 15,000 hp. We-Fu-Go system; Pennsylvania Salt Mfg. Company, Natrona, Pa. (second order), 5000 hp. We-Fu-Go system; Verner Coal & Coke Company, Bulger, Pa., 1200 hp. We-Fu-Go system; Warwick Iron & Steel Company, Pottstown, Pa., 6000 hp. We-Fu-Go system; Youngstown Sheet & Tube Company, Youngstown, Ohio (second order), 8000 hp. We-Fu-Go system; New England Butt Company, Providence, R. I., 300 hp. Scaife automatic system.

The Improved Tilted Turret Screw Machine.

Important improvements have recently been made in the tilted turret screw machine, Fig. 1, built by the Wood Turret Machine Company, Brazil, Ind. Notable among these is the continuous automatic bar feed, a device for

In Fig. 2 is shown the small compact case in which this roller feed is contained. A good idea of the internal construction may be obtained from Fig. 3, which shows the simple construction and the few parts necessary for automatically feeding the stock through the spindle. There are four gears and a scroll which give the power to two rollers, while a second scroll is used to fit the adjusting jaws to the stock used.

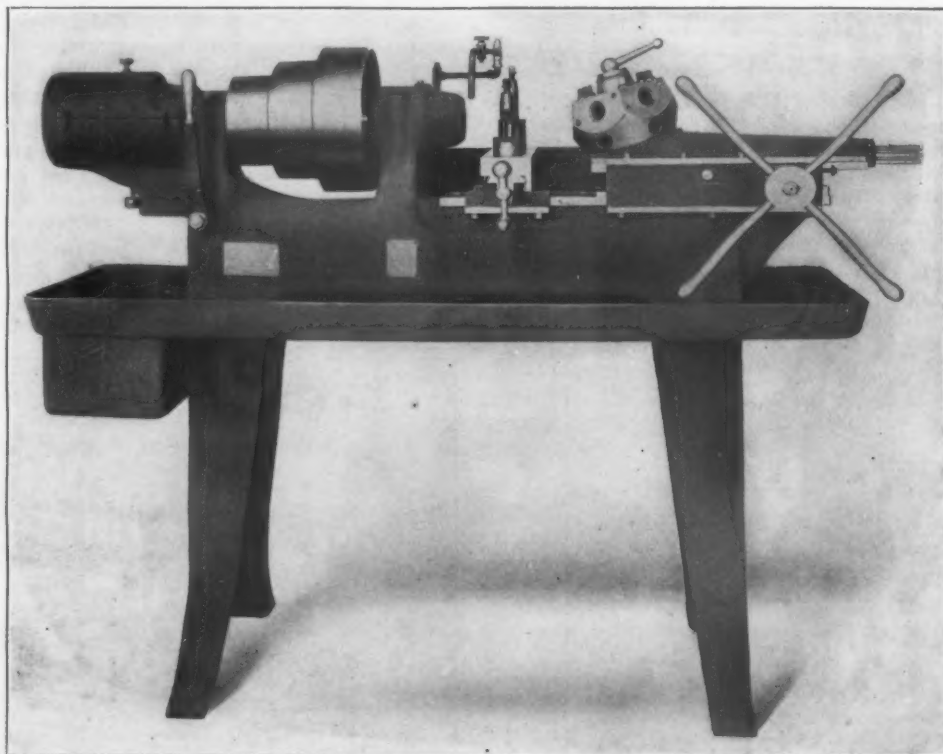


Fig. 1.—The Improved Tilted Turret Screw Machine Built by the Wood Turret Machine Company, Brazil, Ind.

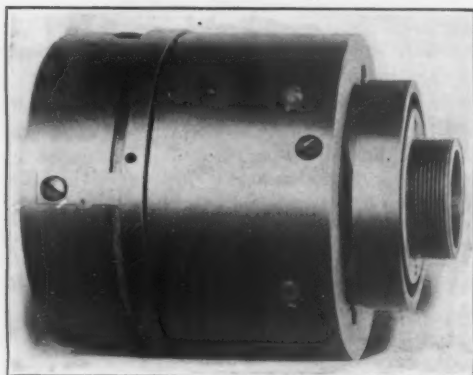


Fig. 2.—The Roller Feed Case.

The sectional view of the spindle head and roller feed, Fig. 4, shows how the power is transmitted to the roller feed gears. When the lever *a* is pushed to the left the wedge *b* is forced between the two brake arms at *c*. These arms are pivoted at *d*, and forcing them apart causes their other ends to close around and grip the scroll *e*. The latter being held still and the spindle carrying the roller feed case revolving, motion is imparted to the gears *f* and *f'* meshing with the scroll *e*, and hence through the gears *g* and *g'* to the rollers *h* and *h'*, which roll the stock in or out, according to the direction the spindle is revolving. Throwing the lever *a* to the right, the clutch collar *j* acts on the chucking finger *k*, which in turn forces the plunger *l* against the collet *m*. The hood *n* being tapered, forces the collet to close and grip the stock. Thus one lever controls two



Fig. 3.—Unassembled Parts of the Roller Feed for Bar Stock.

automatically feeding the bar of stock through the spindle. Heretofore these automatic feeds, usually termed roller feeds, have been applied almost entirely to large machines owing to the fact probably that the working parts were too numerous to be placed in a small compact case.

operations, and at the same time eliminates the danger of trying to roll stock into the machine when it is gripped by the collet.

As shown in Fig. 5, arrangement has been made for adjusting the four jaws which hold the stock. These jaws receive their adjustment from a scroll, shown in

Fig. 3, and in turn adjust the rollers that roll the stock through the spindle. Provision has been made on the stock adjusting jaws to take round, square, hexagon or any other shaped stock that may be used.

Fig. 4 gives a clear conception of the self-oiling of the spindle bearings. It will be noticed that an oil reservoir is cored out below each bearing. These bearings, as shown, have a groove cut in each in which is laid a wick with its ends dipping into the reservoir below.

In Fig. 6 is shown a view of the turret slide and saddle. The tilt of the turret has made possible the use of extra large box tools and die heads, as when swung around they are thrown up at an angle of approximately 30 deg., entirely clear of the turret slide. The turret also being hexagonal allows the box tool to be bolted to the face, leaving the turret hole open to let the work pass through. The hole through the turret obviates the necessity of using large, bulky box tools and die heads for long work, as short box tools and die heads are used. Work when machined is passed into or directly through the turret, coming out at the rear, through one of the auxiliary holes in the lower half of the turret, without interfering with a tool in the rear position.

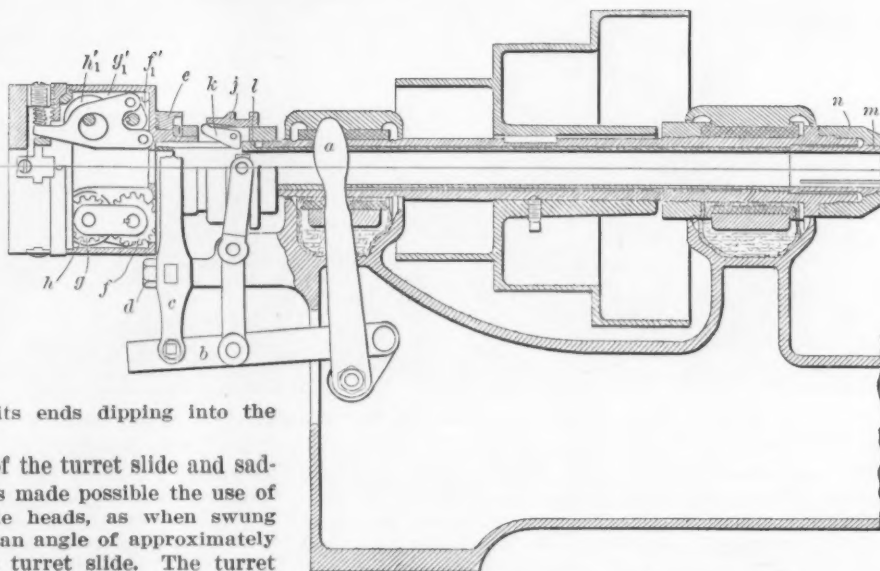


Fig. 4.—Sectional View of the Spindle Head and Roller Feed.

edges of the bed by flat gibs throughout its entire length. There is a supplementary taper base to the saddle, by means of which the tool holes in the turret can be adjusted to the exact height of the center of the spindle.

Fig. 7 shows the arrangement of the parts of the slide and saddle, their small number and the simplicity of

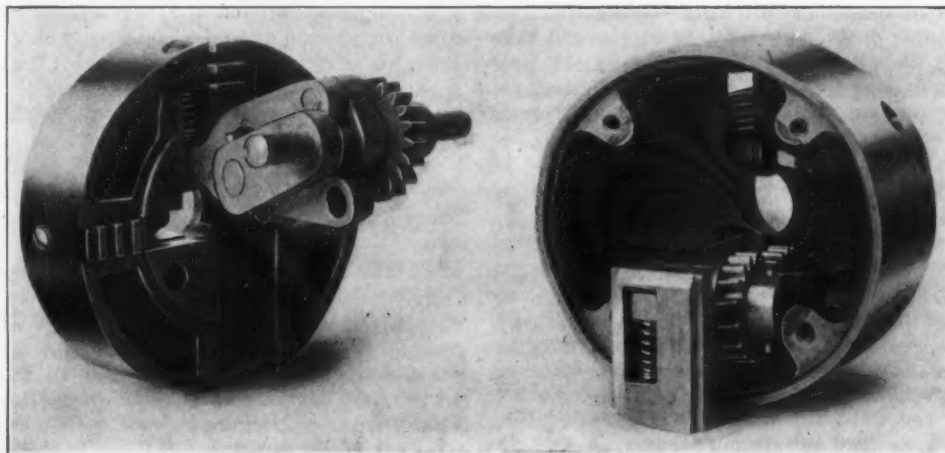


Fig. 5.—An Arrangement for Adjusting the Four Jaws Holding the Stock.

The slide rests and slides in the saddle are furnished with taper gibs fitted the whole length of the saddle on each side, providing means of adjusting the slide sideways. The backward movement of the slide, which is operated by a pilot wheel, rack and pinion, automatically revolves the turret. The saddle is gibbed to the outer

construction. Behind A is the latch pin, the pulling out of which pulls the indexing finger B to one side, causing it to clear the star C. This is a simple provision for instant nonindexing of the turret, a necessity for one-

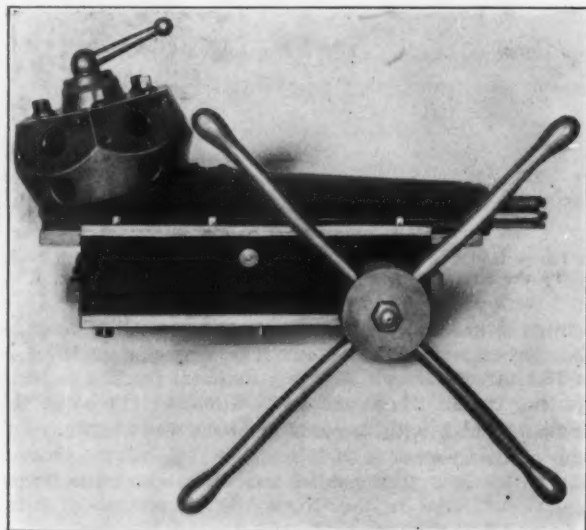


Fig. 6.—The Turret Slide and Saddle.

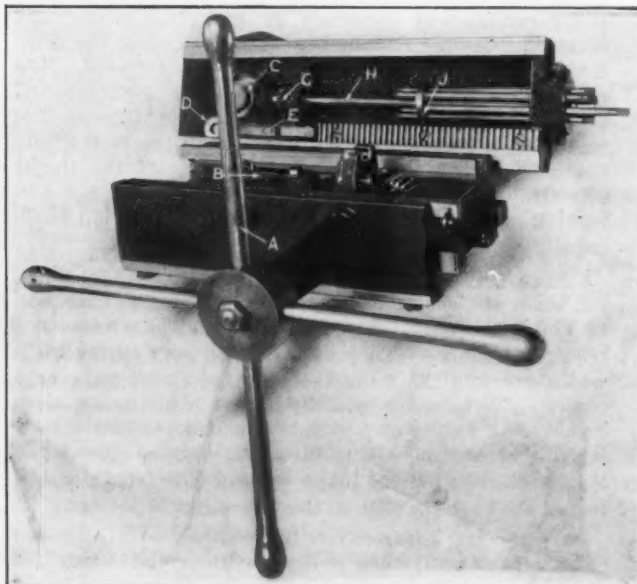


Fig. 7.—The Arrangement of the Parts of the Slide and Saddle.

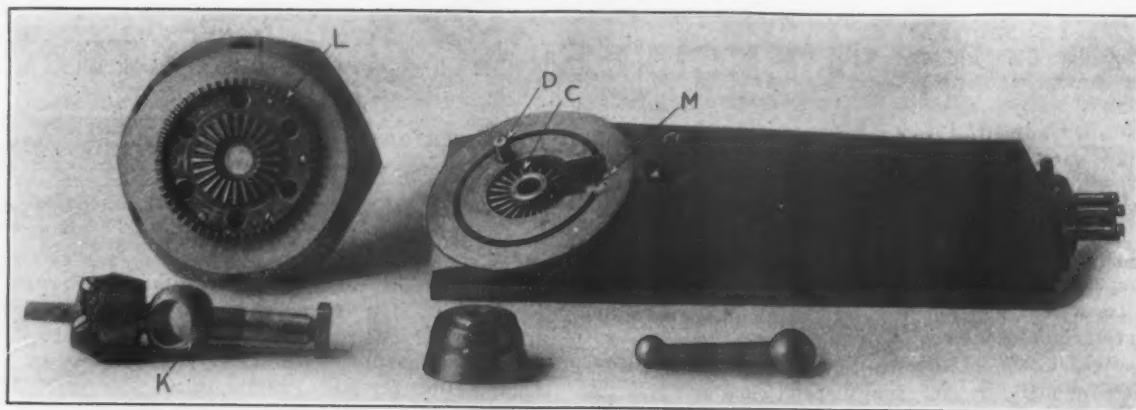


Fig. 8.—The Turret and Slide and Their Parts.

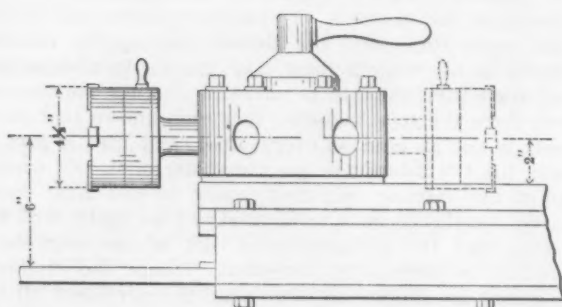


Fig. 9.—Comparison of the Old High Turret and the Tilted Turret.

operation jobs in large quantities. D is the lock pin which passes through the slide into the turret and E is the lock pin lever which, when the eccentric cam F acts on it by the backward motion of the slide in the saddle, pulls the lock pin out clear of its hole in the turret. There is no dragging of the lock pin on the bottom of the turret, but the lock pin is held clear until the turret is revolved to the next hole, when it automatically drops into place and locks the turret.

In Fig. 8 is shown the turret and slide and their respective parts. K is the center bolt which holds the turret in place on the slide. It will be noticed that the center bolt has a taper plug, which is adjustable, so that free movement of the turret at all times may be insured. With the backward movement of the slide the indexing finger engages with the star C, Fig. 7, on the under side of the slide, which in turn swings the turret through one-sixth of a turn. The circular rack L, Fig. 8, acts on the intermediate gear M, which in turn drives the bevel gear G on the small shaft H, which carries the stop disc J with a sliding key, shown in Fig. 7. Automatic stops for each hole in the turret are furnished, which are instantly adjustable to different lengths.

In Fig. 9 is shown the old style high turret and the tilted turret, both machines of the same swing and carrying the same size die head. In both cases the backward position is shown as well as the forward. The engraving makes clear one of the many purposes and advantages gained by having the turret tilted. The strain on the center bolt is minimized, due to the fact that the tilt of the turret applies part of the thrust directly on the slide. This feature also causes a full bearing on the slide and eliminates the tipping, which usually occurred with the old style high turret.

Stock may be passed into or through the tilted turret, since the center bolt has a hole through it, as will be noted in Fig. 8. The die heads and box tools used require no shanks. They have a small boss on the back, which fits into the counterbore of the turret hole, thus centering them, while two cap screws hold the die head or box tool, as the case may be, against the turret face. By this arrangement long threading may be done, or a long stock-reducing cut taken without interfering with a tool in the rear position on the turret.

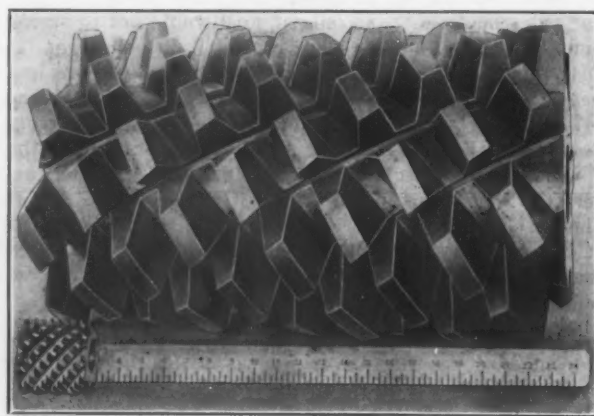
A self-oiling countershaft is furnished with each machine. The two friction pulleys on the countershaft are of single piece construction. The oil reservoir is cored

out completely around the bearing, and this space is filled with cotton and oil. The hanger shaft bearings are provided with oil pockets below them. All these bearings, as shown in the engraving, have a groove cut in which is laid a wick, the ends of which dip into the oil pocket.

An opportunity to see one of these machines in operation may be had by a visit to one of the demonstration shops of Hill, Clarke & Co., Inc., of Boston and Chicago, and their branch offices at New York, Philadelphia and Cleveland.

A Large Brown & Sharpe Hob.

A hob remarkable for its size is shown in the illustration, and is one recently made by the Brown & Sharpe Mfg. Company, Providence, R. I. This hob was cut on a lathe especially constructed for large hob work, and in the illustration is also shown a smaller hob, which



A Large Hob Compared with One of Ordinary Size, Both Made by the Brown & Sharpe Mfg. Company, Providence, R. I.

affords a good idea of the range of sizes that may be handled on such a machine. The diameter of the hob is 15.4 in.; its length 25 3/8 in.; its axial pitch 4 in., and its lead 28 in. There are seven threads right hand, the angle of which with the axis is 54 degrees 25 min. The lead of the grooves is 54.69 in.; the angle of the grooves 35 deg. 34 min. The smaller hob, with which the larger one is compared in the illustration, is one about 3 in. long and 3 in. diameter.

FAILURES IN ENGINEERING CONSTRUCTIONS.*

A Discussion of Their Causes and the Question of Responsibility.

BY DR. CHARLES B. DUDLEY.

Faraday, who spent his life in experiment, used to say that he learned more from his failures than he did from his successes. And it is not difficult to see why this should be so. When an experiment or a construction has proved successful we are naturally most interested in the result, and do not usually spend time and thought and study over the details which have led to our success. On the other hand, if our experiment or construction is a failure, the cause of the failure is immediately sought for, every detail is questioned, and it is this study of the details which broadens our knowledge. Quite in line with Faraday's statement is the rather more homely one that "the scrap heap is the place to learn."

In our studies of failed and broken parts in connection with our work at Altoona for now some years we have been gradually led to ascribe failures to one or more of the four following causes:

1. Bad material.
2. Bad workmanship.
3. Bad or faulty design.
4. Unfair treatment.

Bad Material.

Bad material does not cover those cases where the wrong kind of material was used or material not adapted to the work. If cast iron is used when steel should have been employed, if the steel is brittle when the service requires tough, tenacious metal, this is no fault of the material. Nor can the material be blamed if the size of the part which fails is too small. We would define bad material as that which is different from what those who put it in service had a reasonable right to expect it to be. A rail with a bad pipe in the head, an axle made from a badly segregated bloom, a piece of concrete in which the materials are improperly mixed or contain not enough or inferior cement, are all examples of bad material, and if failure comes the failure may justly be charged to the material.

The query may naturally arise here, Ought not the factor of safety employed to be sufficient to care for the uncertainties of material, so that the total output of a works could be made use of in service? We once knew an officer of a steel works who wanted to have one grade of steel used for all purposes, and who, when told that car axles made of that grade of steel would not be strong enough to hold up the load, replied, "Use more of it; that is, make the axles bigger." Undoubtedly there is a necessary relation between the factor of safety and some of the uncertainties of manufacture, but it can hardly be allowed that the producer should then throw upon the consumer all the uncertainties of material. If the material is bought on specifications, it is reasonable that it should be what the specifications call for. And even if it is bought on indefinite, verbal or written order, such material should be supplied as the buyer had a reasonable right to expect would be furnished.

THE PRICE FACTOR.

But why is there ever any difficulty between the producer and consumer about material? The price is agreed upon when the order is taken and the quality of the material is either specified or understood. Why, then, does not the producer always furnish good material? Our experience on this point has brought us face to face with several explanations of the difficulty we are considering. First and perhaps most important is the price. It is constantly urged that the consumer will not pay the price requisite to secure the materials desired. No information is usually given as to how far the wished-for price, requisite to secure such good materials as the producer would like to furnish, covers a desire for large

profits, and consequently consumers have always been a little slow in attaching much weight to this excuse. On the other hand it is undoubted that competition is the antagonist of quality, and where materials are bought without reasonable specifications rigidly enforced there is unquestionably much weight in the contention of the producer.

UNCERTAINTIES OF MANUFACTURE.

Another reason or excuse for poor materials is that processes and methods of manufacture do not always and every time yield the desired first quality product. Strive as the manufacturer may, the works always turn out some material that is inferior. Taking one illustration from the steel industry, it is well known that every heat is not as good as every other, and that a part of each ingot is inferior to the remainder of it. Of course, all of this inferior part that cannot be sold must necessarily remain as scrap, to be worked over again, with the result that the manufacturing cost of the marketable product is necessarily increased. Hence the tendency to crowd the limits and force upon the purchaser all the merchantable material possible, even though some of it may be inferior. It is fair to say that there is a good deal of human nature in this phase of our subject, and if only those of us who are without sin are entitled to cast stones we greatly fear very few stones will be thrown.

THE PRODUCER AS JUDGE OF NEEDED QUALITY.

Another and most pernicious excuse for furnishing bad materials is the attempt so common everywhere on the part of producers to usurp the legitimate functions of both the consumer and his expert. This manifests itself in the statement, so commonly made by those furnishing material, that it is good enough for the purpose. In the early days the consumer naturally turned to the producer for counsel, but to-day large consumers study for themselves the behavior of materials in service, testing machines and laboratories are increasing, a society for testing materials has come into existence and knowledge of the properties and characteristics of materials has widened; thus where materials are brought on definite specifications, the voice of the producer as to quality is no longer potent, and the old excuse for inferior materials, that they are good enough for the purpose, is no longer entitled to consideration or weight.

Bad Workmanship.

That bad workmanship is a far too frequent cause of failures is common experience. A rivet or a bolt is left out, with consequent increased strain on those which are actually put in, a forging does not fill out the pattern, or the metal is burned, or a weld is defective. We knew a case once where the construction on a passenger coach involved the safety of human life, and where the drawings required that there should be two nuts on a bolt and the end of the bolt riveted over. After the cars had been in service a few weeks and some minor repairs were being made, it was discovered that the bolts originally used in a number of the cars were too short, that the second nut only grasped one or two threads, and that the remaining space in the nut had been filled with putty, so manipulated and stained as to give the appearance of the riveted end which the drawings called for. We knew of another case where two ends of a gas pipe in a small house were joined with putty, instead of with the well known sleeves or thimble. Fortunately the odor of the gas from a slight leak in the defective joint led to its discovery and repair before anything serious happened.

Those of you who have frequently been brought into contact with the results of bad workmanship have no doubt, like myself, often wondered why work was so badly done. Every one will recognize lack of skill, gen-

* From the presidential address to the American Society for Testing Materials, Atlantic City, N. J., June 29, 1909.

eral inefficiency and simple plain laziness as important elements in bad workmanship. It is true the apprentice system or lack of apprentice system which is characteristic of many trades might justly be blamed for lack of skill, but it would lead us too far to consider this point. No doubt many will claim that insufficient compensation is the most fruitful cause of poor quality of work. On the other hand, if we may trust the indications we have been able to gather, the increase in efficiency following voluntary increases in wages has been most disappointing.

WAGE SYSTEMS AND LABOR UNIONS.

In our judgment, the method of compensation for work performed has a direct and most important influence on the quality of the service rendered. We refer especially to the piecework system and to the payment of all interested in proportion to the amount of successful output, which is so common in the steel industry. Both these methods of compensation stimulate output at the expense of quality. We are not at all prepared to suggest any substitute for them, and we have been for many years an advocate of them from the standpoint of successful management. But it is folly for us to close our eyes to the fact that the piecework and other successful output methods of compensation of workmen are antagonistic to quality of work, and that, despite all our efforts to the contrary, they may justly be held responsible for some of our engineering failures.

One more phase of the workman problem. Close observers of the modern workman have noticed for some years a growing tendency on his part to manifest less and less interest in his work. *Esprit du corps*, pride in his work, and a genuine feeling of loyalty and devotion to the establishment of which he forms a part are gradually becoming less and less. The allegiance of the workman, under the influence of the ferment and agitation which now pervades our whole industrial system, is gradually passing over, in a measure at least, to the labor organization. Instead of co-operation there is oft-times antagonism. We are firmly convinced that if labor organizations would devote less time and energy to contention with employers and more effort toward making the organization stand for skill and plain, simple honesty in workmanship, and for fair dealing with, and reasonable devotion to, the interests of employers, all questions connected with the recognition of the union would fade into insignificance and collective bargaining would be welcomed, nay, even sought for, by those who are managing the great industries of our modern civilization.

Faulty Design.

Third, it is evident that the engineer who makes or finally decides upon the design of any structure carries a heavy load of responsibility. He labors under two very serious difficulties. First, it is not possible, many times, to compute the strains to which the whole or parts of the structure will be subjected. In the locomotive driving axle the strains produced, when we regard the locomotive as a vehicle, are simple and easily determined. So likewise the bending moment produced by the action of the steam on the piston, as well as the torsion strain produced by the crank. But who can tell the bending moment produced by the lurch when the wheel strikes a curve at high speed? Who can even give a guess at the strain produced when the brake is applied, making an emergency stop at 60 miles an hour? Moreover, the tendency of the times is toward larger and larger structures. And as the parts increase in size, would any of us be willing to say that the strains in each part would increase directly proportional to the increase in size of the whole structure, or that a proportional increase in size of any given part would so successfully meet the increased strains as did the corresponding smaller parts of the original structure? The engineer who makes the design, perhaps more often than any of us, is at the end of his knowledge, and if failure comes, due to defective or faulty design, deserves, in our opinion, more sympathy than any one else involved.

But the designer is often overruled. The management for economic reasons demands something less expensive.

Of course, under these conditions, much responsibility is taken off the designer. And while we are ready to allow that some check is desirable, since those who make the design are, after all, human and naturally will take care of themselves, we cannot but feel that this check should be sparingly applied in all places where safety to human life is involved.

Unfair Treatment of Material.

Fourth, unfair treatment. If a rail breaks or fails in service there was, says the rail maker, something wrong with the track or with the locomotives or cars that run over it. If a car wheel breaks or fails to give the guaranteed mileage, the track was too rough, the use of the brakes too severe or the lading too heavy, and so on. Far be it from us to say that unfair usage is not many times a legitimate explanation of failures. If a freight locomotive designed to haul a heavy load at 20 miles an hour is used at times on a passenger train at 40 miles an hour, and in so doing shakes herself to pieces, the fault is certainly not in the materials nor in the workmanship, nor in the design, but in the unfair use. If, due to the growth in size of locomotives and cars, an old iron bridge, designed for not over two-thirds the live load which is actually put upon it, gives way and produces a disaster, the responsibility rests with the operating officer rather than with the bridge engineer.

There is, however, another phase of this part of our subject. Unfair treatment is very much broader than the obvious misuse of a bridge or of a moving vehicle. The materials entering into a structure may be unfairly treated. If the calculated strains are too high, or, what amounts to the same thing, too low a factor of safety is employed, materials are unfairly used. Still further, where a structure is a composite it may, and undoubtedly does, often happen that the elements making up the composite are unfairly treated, as when, for economic reasons, not enough money is spent to properly install the structure. For example, a steel rail called upon to do its work supported by too few ties, insufficient ballast and a badly drained sub-grade, is unfairly treated. Moreover, the state of repair in which structures are maintained is clearly an element in their fair treatment. If not enough money is spent in repairs and parts become weakened by decay, corrosion or wear to such an extent that failure results, it is entirely obvious that the failure must be attributed to unfair treatment.

Divided Responsibility.

If now our analysis of the causes of failure is accepted as correct, it is evident that freedom from failure in construction depends on the conscientious and intelligent action of four different contributors to the final result. Moreover there is abundant reason why each of the four parties should try to limit the part which his own work plays in the final result, and say plainly that if the other three had done as they should there would have been no failure. It is plain that the problem of obtaining successful constructions is a complicated one, and that the chances for divided responsibility which are involved are no small element in this problem.

Fiber Stresses in Rails.

Within the last few months two episodes have occurred which clearly illustrate two phases of our theme. The two phases are unfair treatment and the inference that the blame for failure rests on some one else. It will be remembered that within the past two or three years there has been much outcry in regard to broken steel rails, and in the technical press the steel rail manufacturers have been quite severely called to account for their shortcomings. From this platform, in the last annual address, some statements were made indicating that it was believed that the maximum fiber stress in the 100-lb. rail under present conditions of wheel loads and speed was not over 12,500 lb. per sq. in. Some two months ago we received a letter from one of the ablest metallurgical engineers connected with steel rail manufacture in this country, in which this statement was very seriously called in question. The writer of the letter figured that under many conditions the fiber stress

might be double the figure given, and that under extreme, but still possible, conditions the fiber stress might reach nearly four times this figures. The obvious conclusion was, although this was not stated in the letter, that it was these extreme fiber stresses, this unfair treatment, which caused the rails to break. We have tried in vain thus far to get some one much more competent than ourselves to prepare a paper on this subject for this meeting, and one object we have in mind in citing it now is to stimulate study and attention to it. Will not some one take hold of this problem and give it exhaustive treatment, allowing the maximum effect to wheel loads, counter-balance, effect of the steam, want of rotundity, flat spots, nosing and speed? A theoretical treatment, even though we are not all satisfied that the rail acts like a continuous girder supported at the centers of the ties, cannot fail to be valuable.

Broken Rails and the Character of Sub-Grades.

The other episode is the experience of the Atchison, Topeka & Santa Fé Railroad with broken rails on different sub-grades. This road had some 227 miles of railbed which were sandy, porous and well drained, and 91 miles which were largely clay of a kind that holds water. The traffic was the same over both portions and the rail all 85-lb. rail. The rail breakages in one year were two and a half times greater per mile of track on the clay sub-grade than they were on the sandy sub-grade. Mr. Wells, the general manager of the road, was kind enough to say, in communicating this information, that these facts seemed to confirm the statement made in the last year's annual address that "there are indications that rail failures are a question of geography." More to the point for our present discussion is the obvious conclusion that the use of rails on clay subgrade full of water without sufficient porous ballast is unfair treatment, and that breakage under such conditions cannot justly be said to be the fault of the rail.

Better Workmanship and Better Materials.

Let us now devote a few moments to precautions that may be taken with material and workmanship in the interests of safety and to a consideration of what should be our mental attitude toward design and unfair treatment. And first as to workmanship. Under present conditions the necessity for close supervision is evident. We knew an officer of a large corporation some years ago who said to his Board of Directors: "If you will allow me to spend \$50,000 a month more in salaries, so that I may give your work better supervision, I will give it back to you fourfold." Moreover, with the growth of modern industry, and especially with the development of machinery, the individuality of the workmen has necessarily diminished and the present industrial ferment of strikes and lockouts is the revolt against this debasement of individuality. Already there are signs of something better and our belief is that in the not far distant future, as the result of wiser management on the part of labor organizations and reasonable concessions on the part of employers, there will be a return by the workmen to the old fashioned virtues of interest and pride in their work and unswerving loyalty to the organizations which they serve. The effect of this change on the quality of workmanship needs no comment.

Second, with regard to material. It is difficult for us to see how any one who is responsible for safety in structures dare at the present time put material into these structures which has not been bought on carefully prepared specifications, and which, before acceptance, has not been rigidly inspected and tested. As the years go by, there is constant and ready growth in this direction. And while the ground is still far from being covered and the number of standard specifications still far too small, each year brings some progress, some steps forward. This society has a most important mission to fulfill, and the publications of no organization that we know of anywhere are doing more to elevate the standard of quality of materials of construction than the annual volume giving the results of the deliberations of this body.

Responsibility for Design and Use of Materials.

But how about the unfair treatment of materials or the structures made from them? Here no supervision

beyond some meager legislative enactments and the condemnation of public opinion in case of disaster is possible. Damages in cases of accident are no doubt a strong check upon unfair treatment. But it has seemed to us for a long time that the producers of material have far too much neglected their opportunities. Surely it is as legitimate that the producer should study the treatment his material gets in service as that the consumer should study the methods by which that material is made. It is, of course, not to be understood that we are recommending howls about unfair treatment as excuses for inferior materials. What we have in mind is that careful studies and investigations should be made by the producer, leading up to demonstrations if possible. It is common experience that the truth is reached with much greater certainty and speed if a problem is attacked by two parties who approach it from different standpoints and are actuated by antagonistic interests.

Fourth. What shall we say of the engineer who makes the design? The truth is we are using materials in construction without sufficient knowledge. Testing machines, adequate to cope with some of the problems which now confront engineers, do not exist. We are increasing sizes and constantly building larger structures. If the test of service gives a failure it simply proves that our guess as to the increase needed was wrong; and if the test of service shows freedom from failure, we still do not know that we have used material wisely and economically. The factor of safety everywhere is largely a guess. The late A. L. Holley, one of the brightest mechanical engineers in this country 25 years ago, used to speak of "the ridiculous factor of safety, one-half of which is a factor of ignorance." We cannot help feeling that no better use could be made of some small fraction of the millions that have been accumulated by individuals in connection with our great industries during the past half century than in the establishment of a Bureau of Engineering Research. Who will avail himself of this magnificent opportunity?

Operations of American Manufacturers in Canada.

TORONTO, June 26, 1909.—According to the computation of the British Commercial Commissioner to Canada, the capital employed by American manufacturers in branch works in Canada amounts to about \$125,000,000. Since his estimate was formed particulars have been obtained by the Canadian Manufacturers' Association. The association's list of United States concerns having branches on this side of the border contains 112 names. That list covers the period up to the first of last July. Since then more than 30 new American plants have been established in this country, the capital of these being estimated at \$5,000,000. In spite of the progressive rate at which American manufacturing enterprise is being extended into this country the trade balance goes on swelling in favor of the United States. While this \$130,000,000 of American capital is busy producing manufactured products here, Canada continues to import in increasing volume from the United States. In the fiscal year ending March 31, 1908, Canada's imports from the United States exceeded in value its exports thereto by about \$100,000,000. The Canadian trade annexed by American manufacturers by the twofold process of increasing exportation and increasing transplantation, so to speak, ought to be satisfactory to them. It is quite remarkable to see the two increases going on together. It might be supposed that the conditions which determine American manufacturers to establish plants here would be adverse to the exporting of manufactured product to Canada. It seems, however, that the Canadian tariff is high enough on some lines to make it preferable for American manufacturers to establish Canadian plants; while on other lines it is low enough to admit of the profitable exportation of American goods to Canada.

C. A. C. J.

The Oostburg Steel Foundry Company, Oostburg, Wis., is largely extending its trade and has placed G. M. Armstrong, formerly of the Chicago Steel Foundry Company, in charge of its sales department.

The Bliss Compound Pneumatic Forging Hammer.

Compressed air has become the established medium for operating small hand hammers for chipping, riveting, &c., but for large power hammers, except those operated by belt, steam has not yet been replaced. Two explanations for this are that steam is more often available than compressed air in a forge shop, and that as there is an acknowledged loss in every energy transformation it should naturally be more economical to use the steam directly. In a measure the first has ceased to be the fact, as there are nowadays so many demands for compressed air in tools or machinery of various kinds

there is no danger of the pipes freezing in winter when the shop gets cold over night, that the hammer is always cold and that there is no water dropping down on the dies nor steam leaks likely to burn the workman. In addition, in this particular style of hammer, there are the advantages that owing to the construction of the hammer the amount of air used on ordinary blows is only about half the volume of steam which is used in a cylinder of a steam hammer of the same capacity. It would also be possible to effect a more economical operation of the hammer by preheating the air; this could be done at little or no expense, as by utilizing the heat from a furnace stack or the exhaust of a gas engine.

These hammers are not made to work automatically—that is, the lever must be operated for each stroke, and

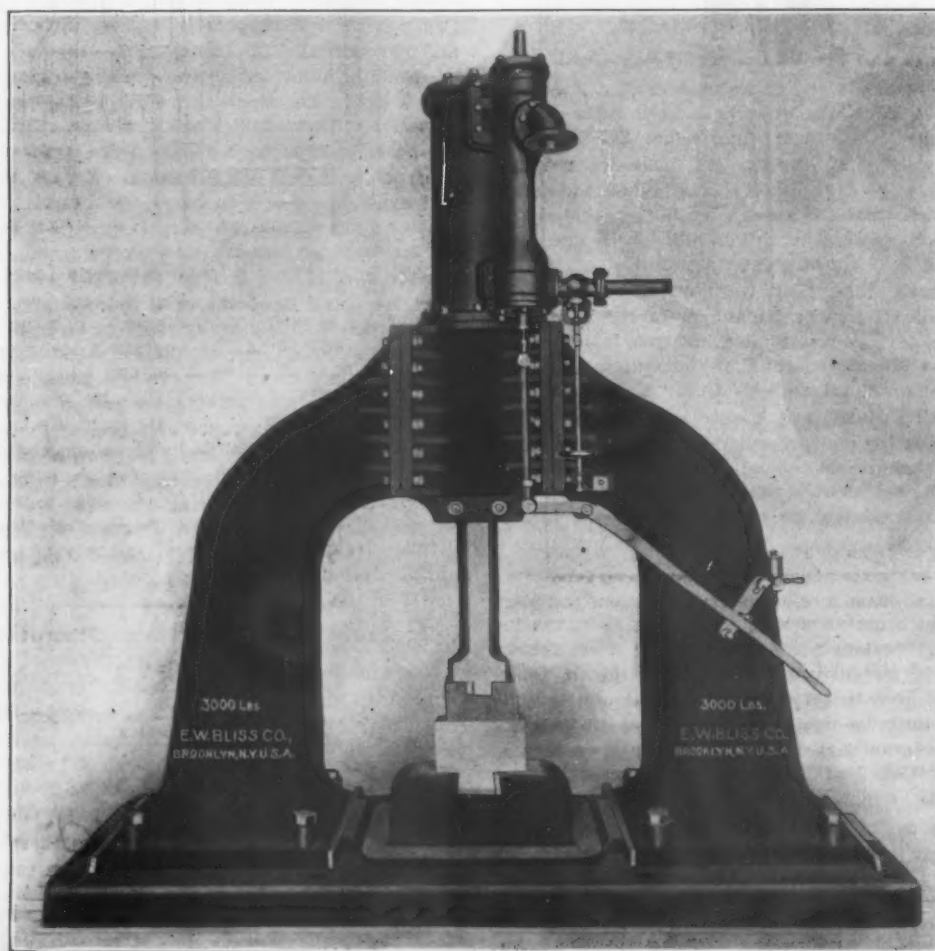


Fig. 1.—A 3000-Lb. Compound Pneumatic Forging Hammer Built by the E. W. Bliss Company, Brooklyn, N. Y.

that an air compressor has become a standard part of the equipment of even relatively small shops. That there is actually any greater economy with steam than air as the working medium becomes a question when the situation is analyzed. If a steam hammer has been standing idle for some time there is condensation in the cylinder that must be worked out before the blow is struck on the work. This involves several strokes, the steam from which is wasted. It is the rule also to use the steam the full length of the stroke in lifting and striking the hammer; that is to say, it is not used expansively by cutting off at any part of the stroke. With compressed air, as there is no condensation in the cylinder, the first stroke may be utilized no matter how long the hammer has stood idle and in the form of hammer now built by the E. W. Bliss Company, Brooklyn, N. Y., known as a compound pneumatic forging hammer, the air used for lifting the ram is exhausted to the top of the cylinder, where, by expanding, it augments the force of the blow struck when the hammer falls.

Fig. 1 shows a 3000-lb. hammer of the double frame type, and Fig. 2 an 800-lb. hammer with a single frame. With these hammers, as with any operated by air, there are the advantages that the hammer can exhaust directly into the shop, in this way aiding ventilation, that

the hammer cannot be left to run idle, as is quite often the practice with steam hammers to keep them ready to strike a blow at any moment by keeping the cylinder hot and free from condensation. With the Bliss hammer there are two types of blow; for an ordinary blow the lifting air is expanded in the top of the cylinder over the ram. If it is desired to strike a still heavier blow air pressure directly from the supply line may be admitted over the piston on the down stroke. This gives a blow approximately 50 per cent. heavier than the ordinary one.

In Figs. 3, 4 and 5 are shown sectional views of the cylinder and valve chamber in such a hammer as that shown in Fig. 2. Fig. 6 shows the valve of a larger hammer, such as Fig. 1, which is somewhat modified for convenience and economy in manufacture, but which operates on essentially the same principles as the valve in Figs. 3, 4 and 5. It principally avoids the long port through the cylinder wall for the lifting air. Fig. 3 shows the holding up position, Fig. 4 the position of the parts when striking an ordinary blow, and Fig. 5 the positions of the valve and ram when striking an extra heavy blow. When the ram is clear up and the starting lever is operated the volume of air beneath the piston is permitted to exhaust and expand through the valve to

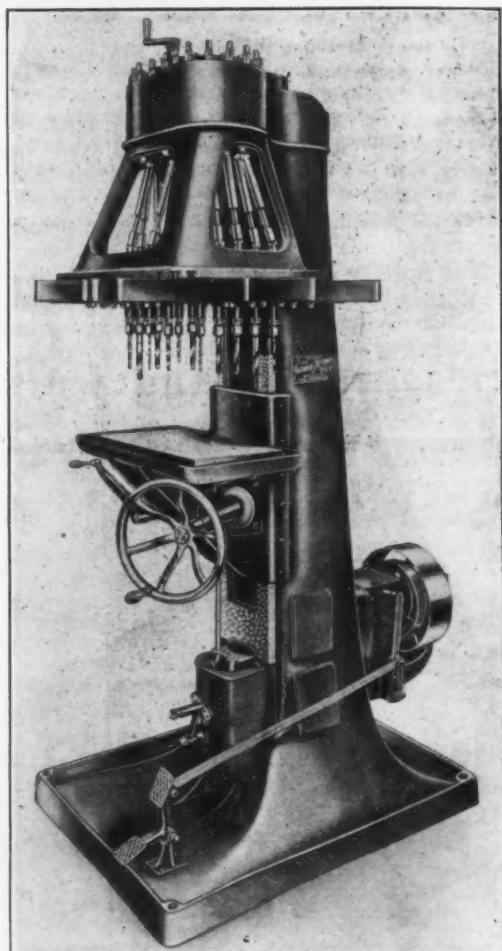


Fig. 2.—An 800-Lb. Single-Frame Bliss Compound Pneumatic Hammer.

the upper side of the piston, where it has about four times the former area to act upon on account of the differential top and bottom piston areas. On the down stroke this air expands, surging from beneath to above the piston, and on the next upstroke is exhausted at ap-

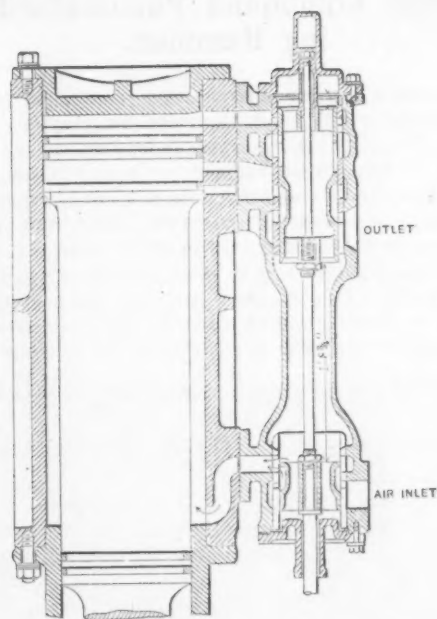


Fig. 6.—Section of a Valve Chest for a Large Hammer.

proximately atmospheric pressure. For the extra heavy stroke, by depressing the operating lever an additional distance, the inlet valve is opened while the ram is descending, admitting not only the air from the lower side of the piston, but additional air from the supply, so that the full pressure is provided throughout the down stroke.

The ram, piston and jaws for securing the die are forged from a solid steel ingot and the section of the ram is nearly uniform throughout, while the cylindrical portion of the ram is almost entirely contained in the guiding cylinder when the blow is struck. It will be seen from the sectional drawings there are two cylinders, A and B, the upper one being the working cylinder and the lower one used only as the guide. The upper end C of the ram working in the upper cylinder A is in the form of a differential piston, as has been explained. The construction of the hammer is very simple. The operating valve is cylindrical, of cast iron with suitable ports, and works in a cast iron liner. The hammers are

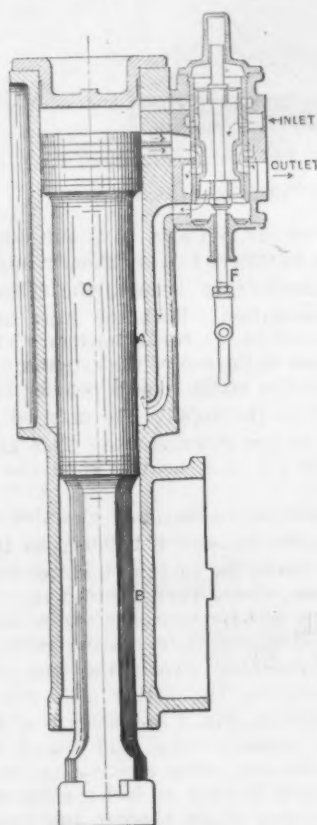


Fig. 3.—Holding Up.

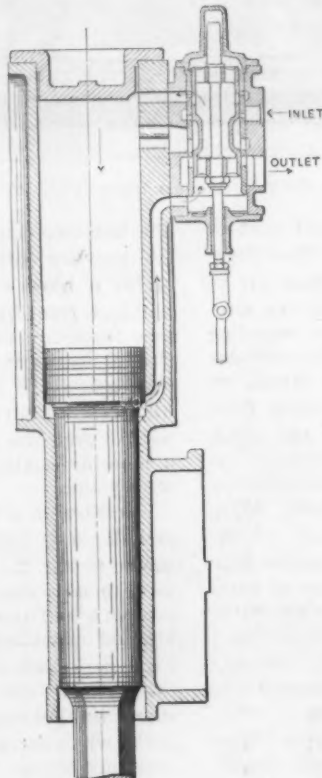


Fig. 4.—Striking Ordinary Blow.

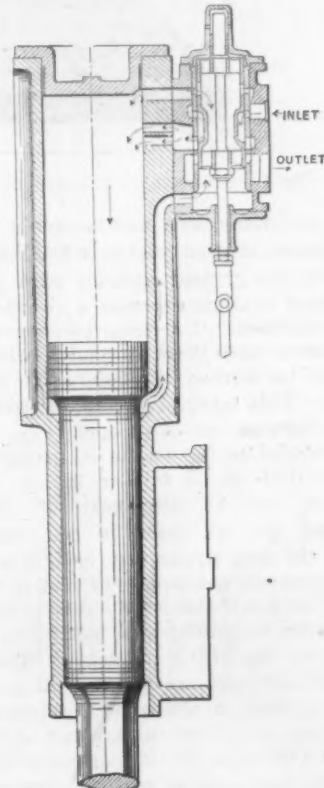


Fig. 5.—Striking Extra Heavy Blow.

Sections of the Cylinder and Valve Chest, Showing Different Relative Positions.

substantially constructed, have few wearing surfaces and are well lubricated, while their method of operation is simple. Any weight of blow, light, regular, extra heavy or holding down, can be given by the corresponding movement of the lever. When the latter is released the ram rises and remains in its highest position.

The hammers will be made in 10 sizes, rated according to their actual falling weight in pounds. The range is 150 in the smallest to 6000 lb. in the largest. The smallest size will strike as a maximum 120 blows in a

minute, the largest 30. The most economical air pressure for any of the hammers is 80 lb. per square inch. The consumption of air in cubic feet per blow struck when using air compressed to 80 lb. varies from 0.158 to 11.2 cu. ft. for the smallest and largest hammers, respectively. Where the compressor is to have no other work, one with a capacity of 30 cu. ft. of free air per minute is sufficient to operate the smallest hammer, while the largest hammer would require 450 cu. ft. per minute capacity.

New Specifications for Shapes, Plates and Rails.

Changes Recommended By Committee A of the American Society for Testing Materials.

Committee A on standard specifications for iron and steel has prepared new specifications for various forms of finished steel for presentation to the convention of the American Society for Testing Materials at Atlantic City this week. Two largely attended meetings of the committee have been held in the past year, and it was decided to rewrite considerable portions of several specifications, adopted in 1901 and not revised since. The committee considered the specifications for wrought iron, but was unable to agree on proposed changes. In view of the many uses to which wrought iron is applied, requiring different specifications, the committee recommends that a special committee on standard specifications for wrought iron be appointed, and that the designation of Committee A be changed to read "On Standard Specifications for Steel."

Splice Bars and Tires.

Only two changes were made in the specifications for steel splice bars. The committee omits the previously prescribed limits of carbon and manganese and retains only the previous limit for phosphorus, which was 0.10 per cent. The second change is in the reference to the location of the test piece, from "the head of the splice bar" to "the splice bar."

In the proposed specifications for steel tires the steel is required to be made by the open hearth process, and to contain not more than 0.75 per cent. manganese, 0.35 per cent. silicon, 0.05 per cent. phosphorus and 0.05 per cent. sulphur. For driving tires for passenger engines the steel is required to have a tensile strength of 105,000 lb. per square inch, 12 per cent. elongation in 2 in. and 16 per cent. reduction of area. For the second class—namely, tires for freight engines and tires for engine truck, tender truck, trailer and car wheels—the physical requirements are 115,000 lb. tensile strength, 10 per cent. elongation and 14 per cent. reduction of area. For the third class, driving tires for switching engines, the physical requirements are 125,000 lb. tensile strength, 8 per cent. elongation and 12 per cent. reduction of area.

Open Hearth Steel Rails.

The committee's proposed specifications for Bessemer steel rails were published in *The Iron Age* of June 17, 1909, page 1922. For open hearth steel rails the requirements are the same as for Bessemer, except as to chemical composition, the substitution of the word "heat" for "blow" in referring to the selection of the piece for the drop test, and the requirement that the letters "O. H." to designate the grade of steel, shall be stamped on each rail so as not to be covered by the splice bars. The paragraph in the open hearth specifications referring to chemistry is as follows:

Rails of the various weights per yard specified below shall conform to the following limits in chemical composition:

	50 to 60 lb.	61 to 70 lb.	71 to 80 lb.	81 to 90 lb.	91 to 100 lb.
Carbon	0.46-0.59	0.46-0.59	0.52-0.65	0.59-0.72	0.62-0.75
Phosphorus, not over	0.04	0.04	0.04	0.04	0.04
Silicon, not over	0.04	0.20	0.20	0.20	0.20
Manganese	0.60-0.90	0.60-0.90	0.60-0.90	0.60-0.90	0.60-0.90

For each decrease of 0.003 per cent. in phosphorus down to 0.03 per cent. phosphorus, an increase of 0.01 per cent. carbon will be accepted.

Three important sets of specifications have been rewritten by the committee and as now proposed are given in full below. The committee also recommends that the present standard specifications for structural steel for bridges be amended by lowering the allowable limit for phosphorus in acid open hearth steel from 0.08 to 0.06 per cent.

Proposed Standard Specifications for Structural Steel for Ships.

1. Steel shall be made by the open hearth process.
2. The chemical and physical properties shall conform to the following limits:

	Structural steel.	Rivet steel.	Steel castings.
Phosphorus, maximum:			
Basic, per cent.	0.04	0.04	0.05
Acid, per cent.	0.06	0.06	0.08
Sulphur, maximum. ....	...	0.05	...
Ultimate tensile strength, pounds per square inch.	55,000-65,000	48,000-58,000	60,000 min.
Yield point.	$\frac{1}{2}$ ultimate tensile str.	$\frac{1}{2}$ ultimate tensile str.	$\frac{1}{2}$ ultimate tensile str.
Elongation, minimum per cent. in 8 in. (Fig. 1) ..	1,500,000	1,500,000	...
Elongation, minimum per cent. in 2 in. (Fig. 2) ..	...	...	18
Character of fracture. .	Silky.	Silky.	{ Silky or fine granular.
Cold bend without fracture	180° flat. 180° flat.		{ 90° d = 3t.

For the purposes of these specifications, the yield point shall be determined by the careful observation of the drop of the beam or halt in the gauge of the testing machine.

3. In order to determine if the material conforms to the chemical limitations prescribed in paragraph 2 herein analysis shall be made by the manufacturer from a test ingot taken at the time of the pouring of each melt of steel, and a correct copy of such analysis shall be furnished to the engineer or his inspector. A check analysis may be made by the purchaser or his representative if desired, in which case an excess of 25 per cent. above the required limits will be allowed.

4. Specimens for tensile and bending tests for structural and rivet steel shall be made by cutting coupons from the finished product, which shall have both faces

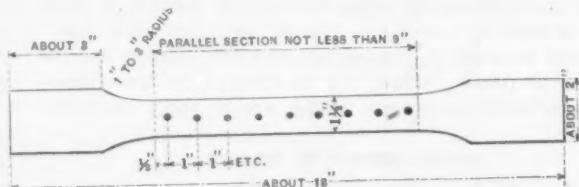


Fig. 1.



Fig. 2.

rolled and both edges milled to the form shown by Fig. 1; or with both edges parallel; or they may be turned to a diameter of $\frac{3}{4}$ in. for a length of at least 9 in., with enlarged ends.

(a) Rivet rounds and small rolled bars shall be tested as rolled.

5. The number of tests will depend on the character and importance of the castings. Specimens shall be cut cold from coupons molded and cast on some portion of one or more castings from each melt or from the sink heads, if the heads are of sufficient size. The coupon or sink head so used shall be annealed with the casting before it is cut off. Test specimens shall be of the form shown by Fig. 2.

6. Material which is to be used without annealing or further treatment shall be tested in the condition in which it comes from the rolls. When material is to be annealed or otherwise treated before use, the specimens for tensile tests, representing such material, shall be cut from properly annealed or similarly treated short lengths of the full section of the bar.

7. At least one tensile and one bending test shall be made from each melt of steel as rolled. In case steel differing $\frac{3}{8}$ in. and more in thickness is rolled from one melt, a test shall be made from the thickest and thinnest material rolled. Should either of these test specimens develop flaws, or should the tensile test specimen break outside of the middle third of its gauged length, it may be discarded and another test specimen substituted therefor. In case a tensile test specimen does not meet the specifications additional tests may be made.

8. For material less than 5-16 in. and more than $\frac{3}{4}$ in. in thickness the following modifications will be allowed in the requirements for elongation:

(b) For each 1-16 in. in thickness below 5-16 in. a deduction of $2\frac{1}{2}$ will be allowed from the specified percentage.

(c) For each $\frac{1}{8}$ in. in thickness above $\frac{3}{4}$ in., a deduction of 1 will be allowed from the specified percentage.

9. Plates, shapes and bars less than $\frac{3}{4}$ in. thick shall bend as called for in paragraph 2.

(d) Steel $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. thick, inclusive, tested as rolled, shall bend cold 180° around a pin the diameter of which is equal to one and one-half times the thickness of the bar, without fracture on the outside of bend.

(e) Steel over $1\frac{1}{4}$ in. thick, tested as rolled, shall bend cold 180° around a pin the diameter of which is equal to twice the thickness of the bar, without fracture on the outside of bend.

(f) Bending tests may be made by pressure or by blows.

10. Angles $\frac{3}{4}$ in. and less in thickness shall open flat, and angles $\frac{1}{2}$ in. and less in thickness shall bend shut, cold, under blows of a hammer, without sign of fracture. This test will be made only when required by the inspector.

11. Finished material shall be free from injurious seams, flaws, cracks, defective edges, or other defects, and shall have a smooth, uniform, workmanlike finish.

12. Test specimens and every finished piece of steel shall be stamped with the melt number, except that small pieces may be shipped in bundles securely wired together, with the melt number on a metal tag attached.

13. A variation in cross section or weight of each piece of steel of more than $2\frac{1}{2}$ per cent. from that specified will be sufficient cause for rejection, except in case of sheared plates, which will be covered by the following permissible variations, which are to apply to single plates.

WHEN ORDERED TO WEIGHT.

Plates $12\frac{1}{2}$ lb. per square foot or heavier:

(g) Up to 100 in. wide, $2\frac{1}{2}$ per cent. above or below the prescribed weight.

(h) 100 in. wide and over, 5 per cent. above or below.

Plates under $12\frac{1}{2}$ lb. per square foot:

(i) Up to 75 in. wide, $2\frac{1}{2}$ per cent. above or below. 75 in. and up to 100 in. wide, 5 per cent. above or 3 per cent. below.

(j) 100 in. wide and over, 10 per cent. above or 3 per cent. below.

WHEN ORDERED TO GAUGE.

Plates will be accepted if they measure not more than 0.01 in. below the ordered thickness.

An excess over the nominal weight corresponding to the dimensions on the order will be allowed for each plate, if not more than that shown in the following tables, 1 cu. in. of rolled steel being assumed to weigh 0.2833 lb.

Plates $\frac{1}{4}$ In. and Over in Thickness.

Thickness ordered.	Nominal weights. Pounds per square foot.	Width of plate.			
		Up to 75 in.	75 in. and up to 100 in.	100 in. and up to 115 in.	Over 115 in.
Inches.	square foot.	Per cent.	Per cent.	Per cent.	Per cent.
$\frac{1}{4}$	10.20	10	14	18	..
$\frac{5}{16}$	12.75	8	12	16	..
$\frac{3}{8}$	15.30	7	10	13	17
$\frac{7}{16}$	17.85	6	8	10	13
$\frac{1}{2}$	20.40	5	7	9	12
$\frac{5}{8}$	22.95	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$	11
$\frac{3}{4}$	25.50	4	6	8	10
Over $\frac{3}{4}$ .....	..	$3\frac{1}{2}$	5	$6\frac{1}{2}$	9

Plates Under $\frac{1}{4}$ In. in Thickness.

Thickness ordered.	Nominal weights. Pounds per square foot.	Width of plate.		
		Up to 50 in.	50 in. and up to 70 in.	Over 70 in.
Inches.	square foot.	Per cent.	Per cent.	Per cent.
$\frac{1}{8}$ up to $\frac{5}{32}$	5.10 to 6.37	10	15	20
$\frac{5}{32}$ up to $\frac{3}{16}$	6.37 to 7.65	$8\frac{1}{2}$	$12\frac{1}{2}$	17
$\frac{3}{16}$ up to $\frac{1}{4}$	7.65 to 10.20	7	10	15

14. The inspector representing the purchaser shall have all reasonable facilities afforded to him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications.

The manufacturer shall furnish a suitable testing machine for testing the specimens, as well as prepare the pieces for the machine, free of cost.

All tests and inspections shall be made at the place of manufacture prior to shipment.

Proposed Standard Specifications for Structural Steel for Buildings.

1. Structural steel may be made by either the open hearth or Bessemer process.

Rivet steel and plate or angle material over $\frac{3}{4}$ in. thick, which is to be punched, shall be made by the open hearth process.

2. The chemical and physical properties shall conform to the following limits:

	Structural steel.	Rivet steel, open hearth.
Phosphorus, maximum, Bessemer, per cent.	0.10	...
Phosphorus, maximum, open hearth, per cent.	0.06	0.06
Ultimate tensile strength, pounds per square inch.	55,000-65,000	48,000-58,000
Yield point.	$\frac{1}{2}$ ult. tens. str.	$\frac{1}{2}$ ult. tens. str.
Elongation, minimum, per cent. in 8 in. (Fig. 1)	1,400,000*	1,400,000
Character of fracture.	Ult. tens. str. Silky.	Ult. tens. str. Silky.
Cold bend without fracture.	180° to diameter of 1 thickness.	180° flat.

* See paragraph 7.

For the purposes of these specifications the yield point shall be determined by the careful observation of the drop of the beam or halt in the gauge of the testing machine.

3. In order to determine if the material conforms to the chemical limitations prescribed in Paragraph 2 herein, analysis shall be made by the manufacturer from a test ingot taken at the time of the pouring of each melt or blow of steel, and a correct copy of such analysis shall be furnished to the engineer or his inspector.

4. Specimens for tensile and bending tests shall be made by cutting coupons from the finished product, which shall have both faces rolled and both edges milled to the form shown by Fig. 1 [see structural steel specification]; or with both edges parallel; or they may be turned to a diameter of $\frac{3}{4}$ in. for a length of at least 9 in., with enlarged ends.

(a) For material more than $\frac{3}{4}$ in. thick the bending test specimen may be 1 in by $\frac{1}{2}$ in. in section.

(b) Rivet rounds and small rolled bars shall be tested as rolled.

5. Material which is to be used without annealing or further treatment shall be tested in the condition in which it comes from the rolls. When material is to be

annealed or otherwise treated before use, the specimens for tensile tests representing such material shall be cut from properly annealed or similarly treated short lengths of the full section of the bar.

6. At least one tensile and one bending test shall be made from each melt or blow of steel as rolled. In case steel differing $\frac{3}{8}$ in. and more in thickness is rolled from one melt or blow a test shall be made from the thickest and thinnest material rolled. Should either of these test specimens develop flaws, or should the tensile test specimen break outside of the middle third of its gauged length, it may be discarded and another test specimen substituted therefor. In case a tensile test specimen does not meet the specification, additional tests may be made.

(c) The bending test may be made by pressure or by blows.

7. For material less than 5-16 in. and more than $\frac{3}{4}$ in. in thickness the following modifications shall be made in the requirements for elongation:

(d) For each increase of $\frac{1}{8}$ in. in thickness above $\frac{3}{4}$ in., a deduction of 1 shall be made from the specified percentage of elongation.

(e) For each decrease of 1-16 in. in thickness below 5-16 in., a deduction of $2\frac{1}{2}$ shall be made from the specified percentage of elongation.

(f) For pins, the required percentage of elongation shall be 5 less than that specified in Paragraph 2, as determined on a test specimen, the center of which shall be 1 in. from the surface.

8. Finished material must be free from injurious seams, flaws or cracks, and have a workmanlike finish.

9. Test specimens and every finished piece of steel shall be stamped with melt or blow number, except that small pieces may be shipped in bundles securely wired together, with the melt or blow number on a metal tag attached.

10. A variation in cross section or weight of each piece of steel of more than $2\frac{1}{2}$ per cent. from that specified will be sufficient cause for rejection, except in case of sheared plates, which will be covered by the following permissible variations, which are to apply to single plates:

WHEN ORDERED TO WEIGHT.

Plates $12\frac{1}{2}$ lb. per square foot or heavier:

(g) Up to 100 in. wide, $2\frac{1}{2}$ per cent. above or below the prescribed weight.

(h) 100 in. wide and over, 5 per cent. above or below.

Plates under $12\frac{1}{2}$ lb. per square foot:

(i) Up to 75 in. wide, $2\frac{1}{2}$ per cent. above or below.

75 in. and up to 100 in. wide, 5 per cent. above or 3 per cent. below.

(j) 100 in. wide and over, 10 per cent. above or 3 per cent. below.

WHEN ORDERED TO GAUGE.

Plates will be accepted if they measure not more than 0.01 in. below the ordered thickness.

An excess over the nominal weight corresponding to the dimensions on the order will be allowed for each plate if not more than that shown in the following tables, 1 cu. in. of rolled steel being assumed to weigh 0.2833 lb.

Plates $\frac{1}{4}$ in. and over in thickness.

Plates $\frac{1}{4}$ In. and Over in Thickness.

Thickness ordered.	Nominal weights.	Width of plate.			
		Up to 75 in.	and up to 100 in.	and up to 115 in.	Over 115 in.
Inches.	Pounds per square foot.	Per cent.	Per cent.	Per cent.	Per cent.
$\frac{1}{4}$	10.20	10	14	18	..
$\frac{5}{16}$	12.75	8	12	16	..
$\frac{3}{8}$	15.30	7	10	13	17
$\frac{7}{16}$	17.85	6	8	10	13
$\frac{1}{2}$	20.40	5	7	9	12
$\frac{9}{16}$	22.95	$4\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$	11
$\frac{5}{8}$	25.50	4	6	8	10
Over $\frac{5}{8}$	..	$3\frac{1}{2}$	5	$6\frac{1}{2}$	9

Plates Under $\frac{1}{4}$ In. in Thickness.

Thickness ordered.	Nominal weights.	Width of plate.		
		Up to 50 in.	and up to 70 in.	Over 70 in.
Inches.	Pounds per square foot.	Per cent.	Per cent.	Per cent.
$\frac{3}{8}$ up to $\frac{5}{16}$	5.10 to 6.37	10	15	20
$\frac{5}{16}$ up to $\frac{3}{16}$	6.37 to 7.65	$8\frac{1}{2}$	$12\frac{1}{2}$	17
$\frac{3}{16}$ up to $\frac{1}{8}$	7.65 to 10.20	7	10	15

11. The inspector representing the purchaser shall have all reasonable facilities afforded to him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications.

All tests and inspections shall be made at the place of manufacture prior to shipment.

Proposed Standard Specifications for Open Hearth Boiler Plate and Rivet Steel.

1. Steel shall be made by the open hearth process.

2. There shall be three classes of open hearth boiler plate steel; namely, flange steel, fire box steel and extra soft steel, which shall conform to the following limits in chemical and physical properties:

	Extra		
	Flange steel.	Firebox steel.	soft steel.
Phosphorus shall not exceed:			
Acid, per cent.....	0.06	0.04	} 0.04
Basic, per cent.....	0.04	0.03	
Sulphur shall not exceed, per cent.....	0.05	0.04	0.04
Manganese, per cent.....	0.30 to 0.60	0.30 to 0.50	0.30 to 0.50
Ultimate tensile strength, pounds per sq. in.....	55,000-65,000	52,000-62,000	45,000-55,000
Yield point, in pounds per square inch, shall not be less than.....	$\frac{1}{2}$ ultimate tensile str.	$\frac{1}{2}$ ultimate tensile str.	$\frac{1}{2}$ ultimate tensile str.
Elongation, per cent., in 8 in., shall not be less than.....	1,500,000	1,500,000	1,500,000
	Ult. ten. str.	Ult. ten. str.	Ult. ten. str. (but need not exceed 30 %.)
Cold bend.....	180° flat.	180° flat.	180° flat.
Quench bend.....			

(a) For the purposes of these specifications, the yield point shall be determined by the careful observation of the drop of the beam or halt in the gauge of the testing machine.

3. Steel for boiler rivets shall be of the extra soft class, as specified in Paragraph 2.

4. For material less than 5-16 in. and more than $\frac{3}{4}$ in. in thickness, the following modifications shall be made in the requirements for elongation:

(b) For each increase of $\frac{1}{8}$ in. in thickness above $\frac{3}{4}$ in., a deduction of 1 shall be made from the specified percentage of elongation.

(c) For each decrease of 1-16 in. in thickness below 5-16 in., a deduction of $2\frac{1}{2}$ shall be made from the specified percentage of elongation.

5. In order to determine if the material conforms to the chemical limitations prescribed in Paragraph 2 herein, analysis shall be made by the manufacturer from a test ingot taken at the time of the pouring of each melt of steel, and a correct copy of such analysis shall be furnished to the engineer or his inspector. A check analysis may be made by the purchaser or his representative, from a broken tensile test specimen representing each heat of flange or extra soft steel on an order, and for each plate as rolled of fire box steel, in which cases an excess of 25 per cent. above the required limits in phosphorus and sulphur will be allowed.

6. The standard tensile test specimen of 8 in. gauged length shall be used to determine the physical properties specified in Paragraphs 2 and 3. The standard shape of the tensile test specimen for sheared plates shall be as shown in Fig. 1. (See structure steel specifications.)

For other material the tensile test specimen may be the same as for sheared plates, or it may be planed or turned parallel throughout its entire length and in all cases where possible two opposite sides of the test specimens shall be the rolled surfaces.

Rivet rounds and small rolled bars shall be tested of full size as rolled.

7. The bending test specimen shall be $1\frac{1}{2}$ in. wide, if possible, and for all material $\frac{3}{4}$ in. or less in thickness the test specimen shall have the natural rolled surface on two opposite sides; but for material more than $\frac{3}{4}$ in. thick, the bending test specimen may be $\frac{1}{2}$ in. thick. The sheared edges of bending test specimens shall be milled or planed. The bending test may be made by pressure or by blows. The cold bending test shall be made on the material in the condition in which it is to be used, and prior to the quenched bending test, the specimen shall be heated to a light cherry red as seen in the dark and quenched in water, the temperature of which is between 80 degrees and 90 degrees F.

Rivet rounds shall be tested of full size as rolled.

8. For fire box steel a sample taken from a broken tensile test specimen shall not show any single seam or cavity more than $\frac{1}{4}$ in. long, in either of the three fractures obtained on the test for homogeneity, as described below:

(d) The homogeneity test is made as follows: A portion of the broken tensile test specimen is either nicked with a chisel or grooved on a machine, transversely about 1-16 in. deep in three places about 2 in. apart. The first groove should be made on one side, 2 in. from the square end of the specimen; the second, 2 in. from it on the opposite side; and the third, 2 in. from the last, and on the opposite side from it. The test specimen is then put in a vise, with the first groove about $\frac{1}{4}$ in. above the jaws, care being taken to hold it firmly. The projecting end of the test specimen is then broken off by means of a hammer, a number of light blows being used, and the bending being away from the groove. The specimen is broken at the other two grooves in the same way. The object of this treatment is to open and render visible to the eye any seams due to failure to weld up, or to foreign interposed matter, or cavities due to gas bubbles in the ingot. After rupture, one side of each fracture is examined, a pocket lens being used if necessary, and the length of the seams and cavities is determined.

9. Three test pieces shall be furnished from each plate as it is rolled; one for tension, one for cold bending and one for quench bending test. For rivet rods, two tensile test specimens and two cold bending and two quench bending test specimens shall be furnished from each melt. In case any one of these develops flaws, or should a tensile test specimen break outside of the middle third of its gauged length, it may be discarded and another test specimen substituted therefor.

10. A variation in cross-section or weight of each piece of steel of more than $2\frac{1}{2}$ per cent. from that specified will be sufficient cause for rejection, except in case of sheared plates, which will be covered by the following permissible variations, which are to apply to single plates.

WHEN ORDERED TO WEIGHT.

Plates $12\frac{1}{2}$ lb. per sq. ft. or heavier:

(e) Up to 100 in. wide, $2\frac{1}{2}$ per cent. above or below the prescribed weight.

(f) 100 in. wide and over, 5 per cent. above or below.

Plates under $12\frac{1}{2}$ lb. per sq. ft.:

(g) Up to 75 in. wide, $2\frac{1}{2}$ per cent. above or below.

(h) 75 in. and up to 100 in. wide, 5 per cent. above or 3 per cent. below.

(i) 100 in. wide and over, 10 per cent. above or 3 per cent. below.

WHEN ORDERED TO GAUGE.

Plates will be accepted if they measure not more than 0.01 in. below the ordered thickness.

An excess over the nominal weight corresponding to the dimensions on the order will be allowable for each plate, if not more than that shown in the following tables, 1 cu. in. of rolled steel being assumed to weigh 0.2833 lb.

Plates $\frac{1}{4}$ In. and Over in Thickness.

Thickness ordered.	Nominal weights.	Width of plate.			
		Up to 75 in.	75 in. and up to 100 in.	100 in. and up to 115 in.	Over 115 in.
Inches.	Pounds per square foot.	Per cent.	Per cent.	Per cent.	Per cent.
$\frac{1}{4}$	10.20	10	14	18	..
$\frac{5}{16}$	12.75	8	12	16	..
$\frac{3}{8}$	15.30	7	10	13	17
$\frac{7}{16}$	17.85	6	8	10	13
$\frac{1}{2}$	20.40	5	7	9	12
$\frac{9}{16}$	22.95	4 $\frac{1}{2}$	6 $\frac{1}{2}$	8 $\frac{1}{2}$	11
$\frac{5}{8}$	25.50	4	6	8	10
Over $\frac{5}{8}$ .....	..	3 $\frac{1}{2}$	5	6 $\frac{1}{2}$	9

Plates Under $\frac{1}{4}$ In. in Thickness.

Thickness ordered.	Nominal weights.	Width of plate.		
		Up to 50 in.	50 in. and up to 70 in.	Over 70 in.
Inches.	Pounds per square foot.	Per cent.	Per cent.	Per cent.
$\frac{1}{8}$ up to $\frac{3}{16}$	5.10 to 6.37	10	15	20
$\frac{3}{16}$ up to $\frac{1}{4}$	6.37 to 7.65	8 $\frac{1}{2}$	12 $\frac{1}{2}$	17
$\frac{1}{4}$ up to $\frac{5}{16}$	7.65 to 10.20	7	10	15

11. Each plate shall be distinctly stamped with its heat or slab number, and with the name of the manufacturer, grade and lowest tensile strength specified. Each test specimen shall be distinctly stamped with the heat or slab number which it represents.

Rivet steel may be shipped in securely fastened bundles with the melt number stamped on a metal tag, attached.

12. All finished material shall be free from injurious surface defects and laminations, and must have a workmanlike finish.

13. The inspector representing the purchaser, shall have all reasonable facilities afforded to him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture, prior to shipment.

Koppers By-Product Coke Ovens for Gary.

As a result of the successful operation of the 280 Koppers by-product coke ovens installed about a year ago in the Joliet plant of the Illinois Steel Company, it has been decided by the United States Steel Corporation to adopt this system for the coke plant at Gary, Ind., work upon which has been commenced. The Gary plant will include 560 ovens, so located as to admit of extension to double this number.

While the general plan of construction will be identical with that employed at Joliet, some slight modifications will be made in the Gary ovens. The gas will be taken off from one end of the oven in order to effect a shortening of the ascension pipes, and the doors will be made in the shape of plugs, with a view to simplifying the brick work on the end of the ovens. Instead of two charging larries, such as are used at Joliet, only one will be required for the new plant. An improvement in the coke quenching arrangement will be introduced, so that instead of having the inclined coke bench the coke will be pushed in a coke quenching car.

The ovens will be arranged in eight batteries of 70 ovens each, the size of each oven being 37 ft. between doors, 17 in. at pusher end, 21 in. at quenching end and 9 ft. 10 $\frac{1}{2}$ in. to top of arch. The charge of coal for each oven will be about 13 tons, making a total charge from the complete eight batteries of about 8000 tons a day, which will yield 10 $\frac{1}{4}$ tons of coke for each oven, or about 6500 tons a day.

There will be available about 50,000,000 cu. ft. of surplus gas, the quality of which, indicated by heat units, is 500 B.t.u. per cu. ft. This represents a heat value of more than 1000 tons of good coal, which can be converted into energy for the generation of industrial power. The yield of sulphate of ammonia as a by-product will be about 80 tons per day, and the quality, it is stated, will be superior to that produced in the old system. In proceeding with the construction, one battery will be built and put in operation at a time, and it is expected that the first of these will be ready for service about July 1, and that the whole eight batteries will be completed within two years.

A decree has been signed by the United States Court for the sale of the property and plant of the South Baltimore Steel Car & Foundry Company, Curtis Bay, Baltimore, Md., for which receivers were appointed October, 1907. Arthur L. Spamer, clerk of the court, has been appointed special commissioner to sell the property, which is to be sold as a going concern. The liabilities are said to be \$1,200,000. Pending the sale of the plant Joseph R. Ford, Arthur G. Wellington and Howard Carlton, receivers, are authorized to continue the operation of the plant.

Announcement is made that the McAdoo tunnels extending from the Hudson Terminal Buildings, New York, to the Pennsylvania Railroad Station, Jersey City, N. J., will be opened for operation on Monday, July 19. On Monday, August 2, the service will be extended to the Erie station at Jersey City and the Lackawanna station at Hoboken, N. J.

THE IRON AGE

Established in 1855.

New York, Thursday, July 1, 1909.

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Canada's Expanding Steel Industry.

Recent developments in the affairs of the leading steel companies of Canada point to expansions such as have not been possible in the difficult years through which these enterprises have passed. Glowing prophecies are again being made for these companies, in view of the capital about to become available for improvements. Some of them are strikingly similar to the very optimistic predictions of eight or nine years ago. We recall something of the expectations aroused regarding the steel plant at Sydney, Cape Breton. The claims of low cost production put forth by some of the promoters of that enterprise even caused some consternation in Great Britain, particularly as it was pointed out that the mother country would furnish a large part of the market for Sydney steel. Within the past fortnight an interview has appeared with a Canadian statesman which resembles some of the statements brought out at the inception of the Sydney project, calculated to show how badly off Pittsburgh is for location and for cost of ore, coke and limestone, as compared with Sydney. Evidently there is a disposition on the north side of the Canadian border, as well as south of it, to see future benefits long in advance of their realization. We hear again that "no place in the world has greater advantages for the manufacture of iron and steel at low cost" than has Sydney. We are told that Sydney steel can be laid down at Port Arthur or Fort William at as low a freight as from Montreal, and that when the deepening of canals is finished this freight cost will be further lessened. There is also the intimation of car works in the future and possibly a shipyard—two projects that commonly attach themselves to announcements of expected steel works expansion. The Pittsburgh handicap in foreign trade, of which we heard when the Sydney works made their first appeal for capital, comes up again. Yet Pittsburgh, "300 miles from the sea," and that even when it has placed its product at the seaboard leaves it "still 800 miles further from Europe than the product shipped direct from Sydney harbor," has been steadily sending steel to Europe in all the years since the Sydney plant started up, while the latter has only occasionally and inconspicuously figured in outside markets.

However, recent announcements are more significant for the future of Canadian steel manufacture since the finances of the two leading companies have now been put on a stronger foundation than for years. For the Dominion Iron & Steel Company the improvements planned include the building of a new blast furnace, making it possible to turn the output of the present group of four

furnaces entirely into steel, while the new furnace will supply the demand for foundry iron. The building of additional coke ovens and a new finishing mill is also part of the plan, the carrying out of which is made possible by a \$5,000,000 bond issue.

The interests now dominant in the Lake Superior Corporation have agreed to build a new blast furnace and to provide additional finishing capacity as part of the terms under which the Ontario government renewed its land grants to the railroad enterprises of the corporation. In addition to an expenditure of \$1,000,000 in pursuance of this agreement with the government there is to be a large outlay on new structural steel works and the building of a merchant mill. It is considered that the British capitalists who have recently come into the Lake Superior Corporation saw that the opportune moment had arrived for advancing the steel enterprise at Sault Ste. Marie to a much more important position than it has heretofore occupied.

The Nova Scotia Steel & Coal Company, which has not attempted operations on the scale of the plants at Sydney and Sault Ste. Marie, now looks toward larger things, preliminary to which a \$6,000,000 bond issue is being brought forward. The company's large resources in coal and in the Newfoundland, or Wabana red hematite, ores, that are the dependence of the Sydney industry, entitle it to a larger place than it has yet undertaken to fill.

For reasons that frequently have been commented on the Canadian steel industry has been beset with difficulties. Even the generous helping hands of the Dominion and provincial governments have not averted serious financial losses. Nature has chiefly bestowed her bounty in fuel on a maritime province and in ore on a detached state at the extreme east, while the strong provinces have relatively feeble resources in both. A great growth in the Canadian Northwest means that Canadian steel works, under government protection, will at length come to the position awarded by their sanguine champions some years ago. But before that day arrives it will have been discovered in Canada as in the United States that in its absorption of new capital the steel industry is monumental and insatiate.

The Changed Distribution of Iron and Steel Demand.

It has been well recognized that the demand for the different finished products of the steel industry declined irregularly at the close of 1907. Before sufficient time had elapsed after the October panic to give actual evidence of the changed distribution of demand it became the general expectation of the trade that heavy products, rails in particular, would suffer most, while the light lines, such as tin plates, wire, &c., would suffer least. These expectations were fully borne out by the record of 1908, while in this year, with its much larger demand, there is a distinct tendency to preserve the changed relations between the different products.

As a portion of this swing bears promise of being permanent it is interesting to set forth in detail the tonnage production of the great divisions of the steel industry in the past three years. The statistical comparisons published annually do not usually present the case in regular commercial form, but an attempt is made to do this in the subjoined table. Standard and light rails, for instance, are separated. It is true that the commercial distinction is at 50 lb. per yd., while the statistical distinction is at 45 lb., the statistics includ-

ing 45 lb. rails with heavier rails, but the tonnage of 45 lb. rails is inconsequential. The table below estimates only the tonnage of pipes and tubes made from skelp. The output of rolled forging blooms and billets is given separately, on the theory that forgings are distinct from rolled material even though the blooms or billets have been rolled. A compilation is made of wrought iron products, so that there is brought together in one summary the total output of the iron and steel industry, excluding foundry iron or iron castings, in the commercial form in which the materials leave the iron and steel industry proper.

Output of Finished Steel and Iron.—Gross Tons.

	1906.	1907.	1908.
Rolled steel:			
Standard rails.....	3,693,275	3,336,891	1,737,671
Light rails.....	284,597	295,838	183,869
Shapes	2,114,053	1,936,379	1,080,758
Plates	2,508,219	2,629,783	1,239,342
Merchant bars.....	2,510,852	2,530,632	1,301,405
Bands and cotton ties....	406,686	469,529	238,148
Hoops	172,332	200,168	169,860
Pipes and tubes.....	1,130,000	1,350,000	850,000
Wire products.....	1,775,000	1,900,000	1,700,000
Sheets	1,029,000	1,044,100	845,501
Tin plates.....	571,000	511,000	535,000
Splice bars.....	213,977	183,108	81,308
Cut nails.....	37,477	35,677	28,842
Unclassified	648,195	899,250	380,383
Total rolled.....	17,094,663	17,322,355	10,372,087
Other steel:			
Rolled forging material....	205,648	227,091	121,039
Castings	773,705	803,117	346,220
Total steel.....	18,074,016	18,352,563	10,839,346
Rolled iron:			
Merchant bars.....	1,481,348	1,440,356	685,233
All other.....	705,209	759,730	553,216
Total rolled iron.....	2,186,557	2,200,086	1,238,449
Total iron and steel.....	20,260,573	20,552,649	12,077,795

That there is method in the relative change in demand is evident. For instance, as a rule, the lines which showed the greatest declines in tonnage from 1907 to 1908 are lines which also showed a decrease from 1906 to 1907. These lines in particular are standard rails, shapes and splice bars. They showed a decline of almost 50 per cent. from 1907 to 1908, yet they had already shown marked declines from 1906 to 1907. Plates, however, are an exception to this rule. Conversely, the lines which showed least decline from 1907 to 1908 are in many cases lines which showed a marked increase from 1906 to 1907, hoops, pipes and tubes, wire products and sheets being conspicuous in this connection. The changes from 1906 to 1907 are noteworthy, considering that the total tonnage was almost identical in the two years.

Thus the year 1907 constituted, in a measure, a transitional period, and the most striking changes are observed by comparing 1906 and 1908. This comparison shows decreases of 53 per cent. in standard rails, 49 per cent. in shapes and 62 per cent. in splice bars, in the line of heavy decreases, while light decreases were 25 per cent. in pipes and tubes, 18 per cent. in sheets, 4.2 per cent. in wire products and 1.44 per cent. in hoops.

The greatest declines were, of course, in railroad material, the great decrease in standard rails and splice bars being wholly in railroad material, while the great decrease in shapes was undoubtedly due in large measure to decreased railroad buying. The declines in these, as noted, started in 1907. Plates stood in a class by themselves, as they increased 5 per cent. from 1906 to 1907, and then decreased 48 per cent. from 1907 to 1908. Heavy operations survived longer in car building than in rail laying, as there were 18 per cent. more cars built in 1907 than in 1906.

It may be noted that a portion of the material reported as plates went into large pipe, the "pipes and tubes" given in the table being simply the approximate tonnage made from material reported as skelp.

The prospects for this year are that should the total tonnage of steel products approach with any closeness that of 1906 or 1907, some lines, such as hoops, wire products and tin plates, are likely to make new high records, and such lines as light rails, bars, bands and sheets are likely to fall not far behind, while standard rails, plates and shapes are likely to stay far below their record tonnages.

Steel castings are largely a railroad material, and it is noteworthy that the 1908 production was considerably less than half the 1907 production.

While the decrease in rolled steel from 1907 to 1908 was 40 per cent., the decrease in rolled iron was 44 per cent. This divergence was due to the great falling off in bar iron production. Steel bars decreased 48.6 per cent., while iron bars decreased 52.4 per cent. The output of some forms of rolled iron decreased relatively little; iron skelp decreased only 33 per cent., while iron nail plate and splice bars showed actual increases, although the total tonnages were quite negligible.

The Panama Canal.

In another part of this issue is a rather extensive account of the work now going on at Panama. As the author explains, the canal is surpassed by others in length; the Suez Canal is, perhaps, upon an equality in commercial possibilities, and the great Chinese wall is comparable in the total amount of material handled. Other undertakings have involved in their execution fully as great an exercise of engineering genius, but, from its demands upon wealth actually accumulated, this enterprise appears unexampled. Even apart from this the canal is unique in its greatness, for never before, apparently, has a piece of construction involved such a grand total of immense commercial results, extraordinary engineering ability and hugeness of endeavor. It is the combination that makes this the greatest of all human enterprises.

For two reasons the canal project could not have succeeded at any previous period of the world's history. To construct it requires the presence of very many men unaccustomed to tropical conditions, and sanitary practice has only recently developed to the point where their health could be adequately protected. This work has already cost the United States about \$8,000,000, but has made the region safe to live in. The second reason is that without the present highly developed mechanical appliances the work would be practically impossible. The steam shovels in the Culebra cut; the train unloaders, spoil spreaders and track shifters at Tabernilla dump; the suction dredges at the Atlantic and Pacific termini, the cableways and pipe line dredges at Gatun and the cranes at Miraflores are examples of the machines that are making the Panama Canal a commercial possibility. Before constructing the Gatun dam, upon the stability of which the permanence of the canal depends, a preliminary investigation was essential which hardly could have been without the wonderful exploratory drills. In general, the machines in use at Panama are not special appliances. Thus, the steam shovels which are performing such conspicuous work were developed long since for similar if less extensive undertakings. With them the Culebra cut, with a water level width of 500 ft., is being dug at a splendid rate because of the present perfection of these machines.

Nations were prosperous and well to do before the advent of the rolling mill, the railroad, Bessemer steel and modern machinery in general, but, apparently, no

nation has ever before been rich enough to spend hundreds of millions of accumulated wealth upon the facilitation of commerce. Pharaoh could control the output of hundreds of thousands of human beings, but that was quite different from spending wealth subsequent to its actual accumulation. It may well be doubted whether the labor of great hordes of ignorant and incapable men can be regarded as an expenditure of wealth. The United States, on the contrary, is spending money, and its ability to make the enormous outlay is an immediate consequence of its position in the steel and machinery worlds. Conversely, it is only because of iron ore and steel and iron products that the commerce of the world at large has become sufficiently valuable to justify a canal worth a half billion dollars. At 5 per cent. the annual value of this enormous amount is \$25,000,000. At what previous period in history was commerce so valuable as to be worth such a yearly tax for its facilitation? Although the Panama Canal project is some hundreds of years old, it is probably being built at the earliest justifiable and possible moment, and by the only nation now possessed of the resources to carry it through to successful completion.

Recent information, although not official, indicates that the canal will be completed and opened by January 1, 1913, or about two years earlier than has been promised. The Gatun locks control the time of completion. Mere excavation will probably be over before the close of 1911. Now the performance of the handling apparatus so far installed is so exceptional that it is reasonably hoped to complete the locks before the end of 1912.

CORRESPONDENCE.

Copper-Tin-Lead Alloy Patents.

To the Editor: On page 1686 of *The Iron Age* of May 27 I note an article referring to a paper of C. H. Clamer, on "The Patent Situation in the United States Respecting Alloys," which was read by Dr. F. T. F. Stephenson before the foundrymen's convention at Cincinnati. To me this paper does not appear to be a discussion on the title chosen, but rather an epitome of their own personal situation. I believe Mr. Clamer claims letters patent on alloys containing under 7 per cent. tin and over 20 per cent. lead, balance copper. To grant a patent on such alloys as late as 1900 to me seems absurd.

The art of producing bearing metals containing under 7 per cent. tin and over 20 per cent. lead, balance copper, was pursued long before the time claimed for patent rights by Mr. Clamer and his associate. Long before Mr. Clamer and others tried to raise the lead percentage in copper-tin-lead alloys, Andrew Allan, Sr., of New York, invented a secret process by which copper and lead may be alloyed in any proportion with or without the use of tin and a perfect homogeneous mixture obtained. Castings weighing 1000 lb. and over can be produced without the slightest signs of segregation.

It is generally believed that a certain percentage of tin is necessary to assist in keeping the copper and lead homogeneously mixed. This is not the case. The introduction of tin into the alloy has no bearing whatever on keeping the lead from segregating from the mix, but rather to harden the alloy and thus reduce proportionally its antifriction and wearing qualities.

The art of amalgamating copper and lead in any desired proportion with or without tin was invented by Andrew Allan, Sr., in 1876, but it was not until 15 years later (1891) that he started to place various alloys on the market under the name of Allan's red antifriction metals, or Allan metals. Starting on a small scale, he had to contend with many difficulties in introducing these alloys, but when their real merits became generally known by the engineering profession the desired position among the bearing metals was gained for them. Large

quantities of these metals were sold throughout the United States prior to 1900; tons were sold in Philadelphia prior to that date, and bearing metal manufacturers were generally aware of their existence.

For years Andrew Allan, Sr., has claimed that no other metallurgist has mastered the art of amalgamating copper and lead with or without tin, and not until they can produce castings of alloys of copper and lead in any proportion, with or without tin, and have them homogeneously mixed, without the slightest sign of segregation, have they the right to claim to be masters of the art.

The claim may arise that Andrew Allan, Sr., is not or has not been manufacturing a copper-tin-lead alloy. True, most of his formulas do not contain tin. This does not affect the case, if the patent in question is legal; then Allan metals are infringements on that patent, as they contain less than 7 per cent. tin and over 20 per cent. lead, balance copper. "One object of the patent in question is to fill a recognized want and provide an alloy for journal bearings which shall hold up within itself more lead than was heretofore possible without the use of nickel." Andrew Allan, Sr., has been meeting these conditions for the past 18 years.

He learned from experience that tin, nickel or other metals added to the lead-copper mixture were quite injurious to the antifriction and wearing qualities of the lead, and without raising the melting point rendered the mixture hard and brittle and not adapted for high grade service, such as facing locomotive, marine and stationary engine steam pistons, piston rod packings for superheated service, bearings for mill pinions, rolling mill and central station engines, &c. Tin especially, because of its adhesive qualities, he found to be a very undesirable element in these alloys, when a high grade antifriction metal was wanted.

This reply to Mr. Clamer's paper is by no means prompted by malice. Its motives are to correct a false impression and to give credit where credit belongs for the invention of this art.

ANDREW ALLAN, JR.

NEW YORK, June 26, 1909.

The Proposed Duty on Pliers, Nippers, &c.

To the Editor: In *The Iron Age* of June 24 we find this statement: "With a view to increasing slightly the protection on nippers and pliers, the Senate has adopted the following new paragraph." Then follows paragraph 194½, putting the duty on these goods at 40 per cent. ad valorem and 10 cents per lb.

We do not suppose you wish to stand in a false position, and therefore give you an illustration of the "slight" increase involved in the paragraph noted. The following calculation is on the leading sizes of what is known in the trade as "button pliers," and fairly brings out the slight increase all round:

	4½ in.	6 in.	8 in.	10 in.
Foreign cost per dozen,				
customs value.....	\$0.68	\$0.79	\$1.02	\$1.33
Weight per dozen.....	3 lb. 2 oz.	5 lb. 13 oz.	10 lb.	12 lb. 12 oz.
Present duty.....	45%	45%	45%	45%
Proposed duty, 40% and				
10 cents per pound..	86%	114%	138%	136%

The button plier is a very popular family tool. A proper assortment of nippers, pliers, &c., would embrace, say, 25 patterns, and each pattern would cover eight sizes, 4 to 8 in. inclusive. As each size has a different weight, it will be seen that, in addition to the enormous advance, in some cases over three times the present duty, in a fair and usual assortment there will be 200 different rates of duty.

ALFRED FIELD & Co.

NEW YORK, June 25, 1909.

The Cleveland Pneumatic Tool Company, Cleveland, Ohio, calls attention to an inaccuracy in the report that it is operating its plant with full force on half time. The company since January 1 has been running its plant on full time. It reports a continued improvement in the demand for pneumatic tools and from time to time since the beginning of the year has taken on additional workmen.

The Baltimore Contract for Fire Protection.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa., as noted last week, has been awarded the contract for the new fire protection system in the city of Baltimore, its bid amounting to \$319,900. The work covers the fire system exclusively. The main streets take about three and one-half miles of 16-in. pipe, the side streets about six miles of 10-in. pipe and the main supply from the power house about 1500 ft. of 24-in. pipe, all of which is to be of open hearth steel and likely to be furnished by a Pittsburgh mill. The suction line taken from the city main will be cast iron, 30 in. in diameter, and the suction line from the harbor 42 in. in diameter. The entire city will be served with 225 8-in. fire plugs and about 300 valves, ranging from 10 to 24 in. in diameter. The valves will be of the well-known parallel seat type, as manufactured for years by the Pittsburgh Valve, Foundry & Construction Company. The body proper is of cast steel, other parts of semisteel, and the valves are bronze mounted. All the fittings will be of cast steel.

The wrought steel pipe will have a special flexible joint, the details of which were worked out by engineers of the Pittsburgh firm, and it has the following advantages: The flexibility will amount to 10 per cent. to allow the pipe to clear any existing obstructions, such as sewers, &c., and to permit of settlement of the lines. This also makes it strong enough to carry its own weight and still remain tight should a portion of the ditch be washed from under the pipe. The joints between the pipe are solid cast iron rings, intended primarily to act as a perfect electrical conductor, so that no danger from electrolysis will arise. An additional precaution will also be taken by coating the pipe with a mineral rubber coating, the pipe first being heated to 400 degrees and then dipped into a bath of mineral rubber of the same temperature. This has the advantage of insulating perfectly and guards against rust and decay. The line will have a working pressure of 300 lb., but will be tested to 600 lb. The ordinary pressure will be 150 lb. It is stated that Baltimore is the first municipality to install the all steel high pressure water system for fire protection, the decision being reached by its consulting board.

The Pittsburgh Valve, Foundry & Construction Company is engaged in turning out the valves, fittings, &c., required on this job, and it is at present operating to about 75 per cent. of capacity, employing from 400 to 500 men. The company recently delivered 30 30-in. valves for the new blast furnaces of the Jones & Laughlin Steel Company, Aliquippa, Pa. Other contracts include valves and fittings from 12 to 16 in. for a gas line to be erected by the Marmet Construction Company in Kansas, and 18-in. valves for the Ohio Fuel Supply Company. Deliveries on the Baltimore contract will begin early in August and will be completed in six months. Roughly, the job involves the movement of 3000 tons of freight from the Pittsburgh District. The Allis-Chalmers Company, Milwaukee, Wis., is to furnish the pumps for the Baltimore installation, its bid being \$65,000.

County Bridge Lettings in Indiana.—The Commissioners of Wells County, Ind., meeting at Bluffton, will receive bids up to 2 p.m. July 5 for a plate girder 75-ft. span bridge; O. D. Garrett, County Auditor. Commissioners of Davies County, Washington, Ind., 1 o'clock, July 6, for one steel and one concrete bridge; Thomas Nugent, Auditor. Commissioners of Miami County, Peru, July 6, 15 bridges and arches; Charles Griswold, Auditor. Commissioners of Marshall County, Plymouth, July 6, one 55-ft. bridge; C. M. Walker, Auditor. Commissioners of Laporte County, Laporte, July 6, three bridges and abutments; C. H. Miller, auditor. Commissioners of Warrick County, Boonville, July 6, 10 steel bridges; Roy F. Cherry, Auditor. Commissioners of White County, Monticello, July 7, stone abutments for 19 bridges; J. L. Ackerman, Auditor. Commissioners of Gibson County, July 8, for the construction and repair of steel bridges.

A St. Petersburg dispatch states that beginning August 1 the Russian telegraph system will make use

of the 24-hr. clock, the numerals 12 to 23 being used to designate afternoon.

The Sault Lock Accident and the Panama Canal.

While the opinion was commonly expressed that the recent accident at the Canadian lock of the St. Mary's Falls Canal would make it impossible to use the canal again this season, repairs have been made and the lock is again in use. It was out of service only 12 days. This accident, in which the lower gates of the lock were carried away, caused many predictions of dire consequences likely to ensue at the Panama Canal in case both gates of a lock should be carried away. On this point the *Engineering News* says:

So much pseudo-scientific nonsense has been written about the dangers of "locks in a flight" that some people have doubtless obtained the idea that the Gatun "flight of locks" will be about as steep as a flight of ordinary stairs, or as the flights of canal locks on some of the small canals such as the Erie. In answer it may be pointed out that each lock of the Panama flight will be 1000 ft. long and that the lift of each separate lock is only 28 ft.—or only about 8 ft. more than in the Sault lock. If all the lock-gates were opened and the water of Lake Gatun allowed to rush down through the locks unimpeded, the velocity resulting would be very little greater (for reasons well known to every hydraulic engineer) than resulted in the Sault lock after the recent accident.

The movable dam above the Canadian lock at the Sault was closed the third day after the accident, some difficulty in its operation requiring to be overcome. On the fourth day the intermediate gates were closed and repairs begun. During the time the waterway through the lock was open, the water flowed through it with a velocity estimated at 15 ft. per second in the lock and 7 ft. in the canal above. This current, however, did no great damage. Apart from the gates lost at the time of the accident, the upper miter wall was slightly damaged, nine timbers were broken in the floor over the culvert and the timber flooring was washed away for 60 ft. The service gate miter sills were also slightly damaged. New upper gates were placed and other needed repairs were made, the movable dam was raised and swung aside and locking of vessels was resumed on the night of June 21, using for the present the intermediate gates at the lower end of the lock.

Driggs-Seabury Ordnance Corporation Extensions.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., manufacturer of ordnance, forgings, drop forgings and general machine work, is making some large additions to its plant. It has placed a contract with the Wm. B. Scaife & Sons Company, Pittsburgh, for a steel frame saw tooth roof building, 100 x 200 ft., as an extension to its present machine shop. When this is completed the machine shop will be 660 ft. long. It is 100 ft. wide. The company is adding to its equipment four hydraulic presses, two of them to be used in forging cranks and the others for pressed steel material, such as automobile frames, &c. It is also installing about 90 new tools, such as lathes, grinders, milling machines, &c., making a total additional expenditure on equipment account of about \$150,000, which it hopes to have completely ready for use about September 1.

The justification for this heavy expenditure is the number of orders the company has on hand, particularly for automobile engine cranks, motor cranks for cam shafts, transmissions, gears, automobile frames, &c. It is getting into that class of work more extensively than ever, having been induced to do so because after it completed some army contracts last year it found the Government was not ready to place additional orders. In regard to the business outlook, the company reports that two years ago, when the depression started, it had 600 men on the payroll; it is now back to about 500 and hopes to have at least 200 more, or say from 700 to 800 men, employed within the next three or four months. It is much encouraged with the improvement in business.

The Tariff Bill in the Senate.

All the Schedules Completed.

WASHINGTON, D. C., June 29, 1909.—The Senate last night completed the consideration of the dutiable schedules and the free list of the tariff bill, and to-day, in accordance with an agreement entered into several days ago, took up for discussion the amendment drafted by the Attorney General and reported from the Finance Committee imposing a tax of 2 per cent. per annum on the net earnings of corporations in excess of \$5000. It is possible that when the bill is formally reported to the Senate from Committee of the Whole slight changes may be made therein, but it is improbable that the metal schedule will be further revised before it is taken up by the Conference Committee.

Duty on Pig and Scrap Iron and Steel.

Imported action was taken on the 25th inst. on several paragraphs of the metal schedule. Senator Aldrich called up paragraph 116, covering pig iron, spiegel-eisen, ferromanganese, wrought and cast scrap iron and scrap steel, and moved the adoption of the Finance Committee rate of \$2.50 per ton. The House provision assessed the same rate on pig iron and spiegeleisen but cut the rate on scrap of all kinds to 50 cents per ton. Senator Cummins of Iowa submitted an amendment intended to eliminate scrap iron and scrap steel from the paragraph relating to pig iron and announced that he would also urge the reduction of the pig iron duty to \$1.50 per ton. Senator Oliver of Pennsylvania opposed the amendment and insisted that the pig iron duty should apply to scrap, declaring that every ton of scrap that enters into the manufacture of iron displaces just a little more than a ton of pig iron, because scrap, having once been manufactured, is subject to less waste in remelting than attends the manufacture of iron from pig. Senator Dupont of Delaware contended that the statement that a ton of scrap always displaces a ton of pig iron was not strictly correct, because in the manufacture of basic open hearth steel at least 40 per cent. must be scrap iron.

Senator Burton of Ohio defended the rate on pig iron and scrap and, speaking of the general treatment of the metal schedule, asserted that in the whole bill no more material or uniform reductions have been made. He contended further that it was unjust to the iron and steel industry to press these reductions further and added that if an equal decrease had been made in all the other schedules of the bill it might have been comparatively easy for the iron and steel producers and their employees to adjust themselves to the cuts in the metal schedule, but, the reductions being unequal, great hardships must result to those from whose products so much protection has been taken away.

Senator Dick of Ohio also protested against any further reduction in the rates on pig iron or scrap. If the Finance Committee amendment should be adopted, he said, American manufacturers of pig iron would sustain a cut in the duty of $37\frac{1}{2}$ per cent., or a reduction from \$4 to \$2.50 per ton. England and Germany are heavy producers of pig iron, their costs ranging from \$8.50 to \$9 per ton, which would enable them to lay their product down here at less than the domestic cost of production. The proposition to reduce the duty on scrap iron and scrap steel from \$4 per ton to 50 cents per ton threatened the very life of the American blast furnace. Scrap iron and scrap steel, he said, had always been considered as entitled to the pig iron rate, and in his opinion that rate ought not to be less than \$3 per ton. Referring to the request of certain Eastern steel manufacturers for a reduction in the duty on scrap iron and scrap steel, he said that these parties illustrated the inconsistent position so many interests in this country have fallen into of asking protection on their finished product, and for a low tariff or no duty at all upon their raw materials. In his opinion it would be very unfair to the merchant blast furnaces of the United States and would imperil the security of their investments and the maintenance of American wages if foreign scrap could be imported at a low figure.

Chairman Aldrich of the Finance Committee defended the amendment on the ground that it was absolutely necessary that the tariff on pig iron and scrap should be the same. The present law fixed a duty of \$4 per ton upon both articles. A reduction in the duty of scrap below that of pig would result in the importation of great quantities of pig broken up so as to pass inspection as scrap. The appraising officers, he said, had great difficulty under the existing law in preventing the importation of large quantities of high grade steel as scrap, and differential rates as between pig and scrap would greatly increase these difficulties. Senator Cummins retorted that a proper definition of scrap would obviate all trouble, and suggested that an amendment be adopted to the effect that "scrap iron and scrap steel are iron and steel which have been advanced to their final form for use, and, being used, have become unfit for further use and are fit only to be remanufactured."

The question was then taken on Senator Cummins' amendment eliminating scrap iron and steel from the pig iron paragraph, but it was defeated by a vote of 28 yeas to 42 nays. Senator Cummins then moved to substitute a rate of \$1.50 instead of \$2.50 on both pig and scrap, but this also was beaten by a vote of 26 yeas to 45 nays. The Senate adopted the Finance Committee amendment in the following form:

116. Iron in pigs, iron kentledge, spiegeleisen, ferromanganese, wrought and cast scrap iron and scrap steel, \$2.50 per ton; but nothing shall be deemed scrap iron or scrap steel except waste or refuse iron or steel in such physical form as to be fit only to be remanufactured.

Increase in Rates on Wire Nails.

Senator Aldrich offered an amendment to paragraph 160 increasing the rates on wire nails one-fourth of a cent per pound above the rates of the House bill. His amendment was as follows:

160. Wire nails made of wrought iron or steel, not less than 1 1/4 in. length and not lighter than No. 16 wire gauge, one-half of 1 cent per pound; less than 1 in. in length and lighter than No. 16 wire gauge, three-fourths of 1 cent per pound.

In support of this amendment Senator Aldrich stated that the Finance Committee had found upon examination that the duty upon wire nails was less than that upon the wire upon which they were made; hence the proposed increase. He called attention to the fact, however, that the proposed rate on the smaller sizes was less than the Dingley rate. Senator Oliver stated that the House rates and the rates of the existing law were absolutely irrational, being less than the rates upon the wire or the rods or the steel billets used in the manufacture of wire nails. He quoted figures to show that the cost of manufacturing wire nails in Germany is \$1.36 per keg of 100 lb., which with freight and duty added permitted them to be laid down in New York at a net cost of \$2 per keg. The cost of manufacturing nails in this country of the average sizes during 1907 was \$1.94 per keg and the average freight from the mills in New York was 17 cents. Referring to his own experience as a manufacturer, Mr. Oliver said that he had produced nails for years at a profit of but 5 cents per keg. The House rate was less than the rebates given by the syndicate managers in Germany to the nail producers as a bonus for export and, if adopted, would turn over to the Germans the entire business of the Atlantic and Pacific coasts. The question being taken on the Finance Committee's amendment it was adopted by a vote of 41 yeas to 33 nays.

Metallic Mineral Substances.

The Senate then took up paragraph 181, covering metallic mineral substances in the crude state, monazite sand and thorite. To this paragraph Senator Aldrich reported two amendments, one increasing the rate on monazite sand and thorite from 4 to 6 cents per pound and the other adding oxide and salts of thorium, gas mantles, gas mantle scrap, &c., the paragraph as amended reading as follows:

181. Metallic mineral substances in a crude state and metals unwrought, whether capable of being wrought or not, not specially provided for in this section, 20 per cent. ad valorem; monazite sand and thorite, 6 cents per pound; thorium, oxide of and salts of, and gas mantles treated with chemicals or metallic oxides, 60 per cent. ad valorem; gas mantle scrap consisting in chief value of metallic oxides, 20 per cent. ad valorem.

The amendment was advocated by Senator Heyburn of Idaho, who stated that large quantities of monazite sand are being mined in his State, and by Senator Lodge of Massachusetts, who said that the manufacturers of gas mantles were satisfied with the duty on the raw material in consideration of the rate applicable to mantles. The question being taken, the amendments were adopted by a vote of 39 yeas to 24 nays.

Specific Duties for Files.

Senator Aldrich submitted a substitute for paragraph 154 relating to files, which he said involved no change in the amount of duty, but provided specific rates in place of the 40 per cent. ad valorem duty of the bill as passed by the House and originally reported to the Senate. The substitute, which was agreed to by the Senate without the formality of a roll call, was as follows:

154. Files, file blanks, rasps and floats of all cuts and kinds, 2½ in. in length and under, 25 cents per dozen; over 2½ in. in length and not over 4½ in., 50 cents per dozen; over 4½ in. in length and under 7 in., 65 cents per dozen; 7 in. in length and over, 80 cents per dozen.

On motion of Senator Guggenheim of Colorado the Senate inserted in paragraph 115, relating to iron ore, the words "and manganiferous silver ore," thereby imposing on that product a rate of 25 cents per ton.

Senator McCumber offered to paragraph 194, relating to machinery, an amendment providing that all machines "used for the manufacture of linen or cloth from flax and flax fiber imported prior to January 1, 1912, shall be admitted free of duty," which was adopted.

Duty on Cash Registers Sustained.

Senator Beveridge, of Indiana, called up the amendment of which he gave notice last week, reducing the duty on cash registers from 30 to 15 per cent. ad valorem. In explanation of this proposed change Mr. Beveridge repeated the arguments heretofore described in this correspondence, his chief contention being that the production of cash registers is now in the hands of a monopoly which sells its products abroad at about one-half the prices charged at home. Senator Burton, of Ohio, opposed the amendment and by a close vote of 31 yeas to 33 nays it was beaten.

Senator Aldrich from the Committee on Finance reported a substitute for paragraph 131, which was adopted as follows:

131. Grit, shot and sand made of iron or steel that can be used only as abrasives, 1 cent per pound.

Senator Aldrich also presented an amendment increasing the duty on metallic hooks and eyes from 4 cents per pound and 15 per cent. ad valorem to 5 cents per pound and 15 per cent. ad valorem. He also reported from committee an amendment to paragraph 650 of the free list granting free entry to "vases, retorts and other apparatus, vessels and parts of, composed of platinum, for chemical uses," which was adopted without debate, as was also a modification of this paragraph including platinum sponge offered by Senator Kean, of New Jersey.

On motion of Senator Gallinger of New Hampshire paragraph 163 was amended so as to increase the duty on "needles for knitting and sewing or embroidery machines, including latch needles," from \$1.25 per 1000 and 25 per centum ad valorem to \$1.25 per 1000 and 35 per centum ad valorem.

An amendment reported by Senator Aldrich imposing a specific duty of ½ cent per pound in addition to the ad valorem duty of 55 per cent. on highly finished bottle caps of lead was adopted. On motion of Senator Curtis of Kansas the Senate agreed to increase the duty on "zinc in blocks or pigs and zinc dust," embraced in paragraph 191, from 1-13 to 1½ cents per pound. This restores the Dingley rate on spelter, &c.

An amendment to paragraph 189, offered by Senator Kean of New Jersey, placing time detectors in the same category with watch movements was adopted.

Compromise Rates on Structural Steel.

Senator Aldrich from the Finance Committee reported an amendment to paragraph 119 dividing structural steel into two classes—namely, that valued at 9-10 of 1 cent per pound or less and that valued above 9-10 of 1 cent, providing a duty of 3-10 of 1 cent per pound on the

former and 4-10 of 1 cent per pound on the latter class. The House bill provided a flat rate of 3-10 of 1 cent on all structural steel, which the Finance Committee originally raised to 4-10 of 1 cent. The amendment offered by Senator Aldrich, which was adopted after brief debate, is, therefore, a compromise between the Ways and Means and Finance Committee rates and is regarded as likely to be accepted by the Conference Committee.

Senator Cummins, of Iowa, one of the Republican insurgent leaders, offered a series of amendments reducing the rates in paragraphs 116, 119, 134 and 160 of the metal schedule, but they were voted down *en bloc*, 31 yeas to 40 nays.

Senator Gamble, of South Dakota, offered an amendment imposing a duty of 4 cents per pound upon tin ore, pig tin, &c., whenever it shall be produced in the United States in commercial quantities. The Senate appeared to be disposed to reject this amendment, but at the suggestion of Senator Aldrich it was placed in the bill as a proviso to paragraph 691 of the free list, with the understanding that the Finance Committee would investigate the subject before urging the modification in Conference Committee. The text of Senator Gamble's proviso is as follows:

There shall be imposed and paid upon cassiterite, or black oxide of tin, and upon bar, block, pig tin and grain or granulated, a duty of 4 cents per pound when it is made to appear to the satisfaction of the President of the United States that the mines of the United States are producing, and will continue to produce, 1500 tons of cassiterite and bar, black and pig tin per year. The President shall make known this fact and fix the date upon which this duty shall go into effect by proclamation.

Cotton Ties Retained on Dutiable List.

A protracted debate followed an amendment offered by Senator Culberson, of Texas, the minority leader, placing on the free list "hoop or band iron or hoop or band steel, cut to lengths, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for baling cotton or other commodity." In support of this amendment Senator Culberson stated that it required about 8½ pounds of cotton ties to properly bind a bale of cotton, which, under the Dingley rate, amounted to a duty of 4¼ cents per bale, which was practically prohibitive on foreign cotton ties. Senator Aldrich opposed the amendment, declaring there was no more reason why cotton ties should be put upon the free list than that steel rails should be. The pending bill reduced the duty from half a cent per pound to three-tenths of a cent, equivalent to but \$6 per net ton. With the unrivaled iron resources of Virginia, Tennessee, Alabama and Georgia and with their ore deposits and opportunities to manufacture ties, every Senator from the South ought to vote against the pending proposition. With a duty of \$2.50 per ton on pig iron, the rate on cotton ties was very moderate, and they ought to be made in the South. Mr. Culberson's amendment was finally rejected by a vote of 31 yeas to 38 nays.

W. L. C.

Bids have been recently advertised for by the Navy Department for the construction of the highest tower wireless telegraph system yet devised. It is proposed to build at Washington a concrete tower which will rise 600 ft., overtopping the Washington monument by 45 ft. Installations will also be made on board the various vessels of the fleet, so that it will be possible to telegraph 3000 miles seaward and from vessels to land a distance of 1900 miles. The Navy Department has been working on the scheme for about two years. An appropriation of \$70,000 for the construction of the tower and of \$100,000 for the purchase of wireless instruments is available.

During the years 1908 and 1909, says the *Wall Street Journal*, the railroads almost made up a decrease in gross earnings of \$168,564,700 by reducing expenditures \$144,818,185, equal to 86 per cent. This should provide a forcible and impressive lesson to congressional and legislative bodies now wrestling with national, State and municipal economies.

The Wm. Cramp & Sons Ship & Engine Building Company.

The annual report of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, for the 12 months ended April 30 last, shows net profits of \$747,949, an increase of \$192,214, and surplus, after charges, of \$446,153, an increase of \$203,426. Following are the figures with comparisons:

	1909.	1908.
Net profits.....	\$747,949	\$555,735
Fixed charges.....	301,796	313,008

Surplus..... \$446,153 \$242,727

The general balance sheet as of April, 30, 1909, compares as follows:

<i>Assets.</i>		1909.	1908.
Real estate, machinery, &c.....	\$12,890,812	\$12,877,740	
Bills and accounts receivable.....	293,921	748,133	
Material and supplies.....	343,581	472,246	
Cash	1,592,956	740,883	
Claims in litigation, &c.....	730,085	713,484	
Totals.....	\$15,851,356	\$15,552,486	
<i>Liabilities.</i>		1909.	1908.
Capital stock.....	\$6,098,000	\$6,098,000	
Bonds and mortgages on real estate...	5,919,912	6,134,912	
Merchandise (not due), wages, interest, &c.....	401,490	333,773	
Surplus	3,431,954	2,985,801	
Totals.....	\$15,851,356	\$15,552,486	

President Henry S. Grove, in his accompanying statement, says:

It may be proper to remind you of the policy stated in our annual report of 1904 of estimating earnings on contracts in process conservatively, and while congratulating you upon the increase of the surplus, to state that a number of contracts were entirely completed during the past year, the profits from which could be accurately determined and properly put in the earnings of the company. The work of construction extended over previous years, but the actual profit on these contracts could not be ascertained; hence, although we have done in the year 1908-09 a smaller volume of business, our surplus, we trust, is satisfactory. There are no unpaid bills except those in process of auditing. Since the present management has been in charge the property has been maintained in its highest state of efficiency, the expense thereof being charged to current earnings; and it has paid out in cash in redemption of bonds and liquidation of mortgages \$1,168,400, and expended on improved machinery and property \$428,065.80.

The prospects for all departments of the company are more promising than at the time of the last annual report, and the actual aggregate of orders on the books at the close of business April 30 exceeded the amount on the same date last year. At present there are many inquiries for vessels for special purposes, and the outlook is greatly improved. Our subsidiary companies and departments other than shipbuilding have continued their successful development, and their resources and possibilities are more promising for the current year.

Information Wanted.—A correspondent requests data as to the amount of waste on scrap iron or steel occurring in the manufacture of iron or steel vehicle axles such as are used in carriages and wagons. For example, if a manufacturer uses 100 tons of steel axle bars or billets in the manufacture of such axles, what percentage of the 100 tons would he recover as merchantable scrap (crop ends, turnings, clippings, &c.) and what percentage would be a dead loss in the form of scale, grindings, &c.? He also asks what would be the average of merchantable scrap recovered in the manufacture of springs for such vehicles. We would be glad to receive the information for the benefit of our inquirer.

The two new 600-ft. lake freight boats for which the Pittsburgh Steamship Company has placed an order with the American Shipbuilding Company, mention of which was made last week, were ordered to take care of the depreciation of the United States Steel Corporation's fleet and to replace old boats that are too small for the present lake trade. The new steamers will have

a carrying capacity of 12,000 tons each. With the completion of these boats the Pittsburgh Steamship Company will have at the opening of navigation next season 16 vessels of more than 19,000 tons capacity each, 12 of these being 600-ft. steamers. It is figured that during a full season these 16 large freighters can move about 5,000,000 tons of ore.

Central and South American Notes.

SAN JUAN, CENTRAL AMERICA, June 5, 1909.—Chilian finances are improving steadily. According to President Montt \$6,000,000 in gold and \$27,000,000 in paper currency are now available for public works. The harbor improvements at Valparaiso have already cost millions, but the Government of Chile will spare no expense in rebuilding this important port. The treaty with the United States has generally been well received in Chile, and it is expected that commercial relations will increase. The public debt has decreased by \$1,600,000.

The Brazilian Congress is endeavoring to frame a law by which all customs duties are to be paid in gold. The Bank of Brazil shows a credit balance of \$8,500,000.

The exports of France to Brazil have increased in the last fiscal year by \$3,500,000. The exports of Brazil to France were \$16,500,000.

The Leopoldina Railway is to extend its lines to Mar de Hespana. For this purpose a contract has been signed with the Sao Paulo & Central of Brazil Railroad.

Brazil is sending agents throughout Europe to lecture on its resources, climate, and especially its agriculture and mines of gold, copper and iron.

The last report of the Argentine Bank inspector shows for 22 banks an increase in deposits of \$57,000,000. The business at the clearing house amounts to \$165,000,000. Deposits of gold are constantly on the increase.

The late general strike in Argentina which combined with the anarchistic movement was put down by the police without further damage.

The dry season in the pampas has continued for several weeks, and the crops are suffering.

The works for the establishment of a free zone at La Platta, Argentina, are now commencing, and all facilities will be given at the above port for this purpose.

The Mollendo, Peru and Bolivia railroads to Arequipa are now in good working order. The Chilian concessionaires are now pushing work on their lines in Bolivia.

The late revolutionary scare in Nicaragua, Guatemala and Honduras has begun to calm down, and business at the ports, Pacific and Atlantic, as well as on the railroads, is getting normal. Salvador is trying to get capital in England to push its railroads beyond the frontier. An Atlantic outlet for this republic is absolutely necessary for its existence, commercial and civil. c.

A Large Order for Erie City Boilers.

The Erie City Iron Works, Erie, Pa., has recently put on the market a new type of water tube boiler. It has just closed a contract with the Jones & Laughlin Steel Company for 12,000 hp. of boilers of this type. The contract was placed with T. H. McGraw, Jr., Pittsburgh's sales manager of the Erie City Iron Works, and is for 30 boilers of 400 hp. capacity each. They will be installed in the new plant of the Jones & Laughlin Steel Company now being built at Aliquippa, Pa.

The most striking feature of this new boiler, which is of the vertical type, is its simplicity. There is only one drum used at the top and one at the bottom of the boiler, these drums being of comparatively large diameter. The tubes are bent in varying degrees, somewhat as in the Stirling type of boiler. The boiler is said to have shown most excellent results in tests made both for efficiency and overload capacity. The upper drum is designed so as to give large liberating surface, and a very unique feature is introduced, which insures dry steam. Fourteen of the boilers bought by the Jones & Laughlin Steel Company are to be hand fired, the furnaces being equipped with Erie City shaking and dumping grate bars. The other 16 boilers will be fired with blast furnace gases.

The Testing Society's Meeting.

Opening of the Twelfth Annual Convention.

ATLANTIC CITY, N. J., June 29, 1909.—The registration on the first day gives promise of a well attended meeting of the American Society for Testing Materials, and the programme, in variety and character of papers relating to materials of construction, is one of the best in the society's history. The iron and steel sessions on Wednesday and Thursday morning promise discussions of unusual value.

To the president, Dr. Charles B. Dudley, Altoona, Pa., whose ability to draw out discussion from those best able to contribute from their experience has been admirable always, much of the success of the society's meetings is to be attributed. He welcomed the members and guests at the opening this afternoon and at once took up the work in hand. The report of the Executive Committee showed a net gain of 145 in membership in the year, the total now being 1160. Of these 305 are also members of the International Association for Testing Materials. The treasurer's report showed disbursements of \$9756.07 in the year, with a cash balance June 15, 1909, of \$1217.78. This balance was only secured, however, by the advance payment of dues for the fiscal year beginning July 1, 1909, to the extent of \$3385, so that a deficit is likely in the coming year unless a special method of raising funds is resorted to—possibly through subscriptions by contributing members who have not been called on in the past two years.

Robert Job and Max H. Wickhorst were appointed tellers of the election for members of the Executive Committee and W. A. Bostwick, Pittsburgh, and W. R. Webster, Philadelphia, were chosen to serve for the ensuing two years.

Tests for Insulating Materials.

C. E. Skinner read a paper on "The Desirability of Standardizing the Testing of Insulating and Other Materials." With many insulating materials, the speaker said, particularly the mineral and vegetable gums and waxes, there are no testing methods now available which give a satisfactory measure of their desirable or undesirable qualities. It is also very easy for one skilled in the testing of mica to determine whether it is hard or soft, or has the necessary flexibility for molding purposes, but up to the present time no means of measuring these qualities has been devised that would give these results numerically. It was suggested that if a specific form and dimension of test sample for molded insulating material, and a certain specific method of making dielectric tests, absorption tests, fireproofing tests, &c., be adopted for such materials, each producer will get the same information as he gets at the present time, but in such form that he can understand the information obtained by any one else in testing the same class of materials.

President Dudley announced that a committee of the society on standard tests for insulating materials is now in process of organization.

J. E. Capp, chairman, presented the report of Committee N, on hard drawn copper wire, containing the proposed standard specifications on hard drawn round wire, grooved trolley wire and hard drawn cable or strand. On motion these were ordered submitted to a letter ballot of the membership.

Boiler Efficiency and Heat Values of Coal.

D. T. Randall read a paper prepared by himself and Perry Barker on the "Effect of the Various Constituents of Coal on the Efficiency and Capacity of Boiler Furnaces." Much interesting detail was given of tests conducted to show the relation between content of volatile matter, ash, &c., and the performance of furnaces. The paper made the point that laboratory tests are the most reliable gauge of the efficiency of coal, boiler tests being rather a crude method of making comparisons, particularly if the fireman is not acquainted with the coals used. The general statement was made, in view of the figures collated by the writers of the paper, that good results may be obtained from almost any coal provided attention

is given to the conditions under which it is burned. Putting it another way, it was stated that a furnace can be designed to burn almost any kind of coal with good efficiency. First in importance in determining results are the heat units in the coal. Next in importance is the size of the coal as burned in the furnace.

In the discussion of the paper, Mr. Randall was asked to what extent moisture in coal adds to the efficiency of the boiler in view of the presumption that the steam into which the moisture is converted adds more to furnace efficiency than does hot nitrogen or hot oxygen. He replied that in general moisture is a bad thing in a boiler furnace, absorbing heat at a time when it should be given to the boiler and reducing furnace temperature. Moisture also carries a large number of heat units out through the stack. Furthermore, where steam is injected it takes about as much heat to dissociate the gases in the steam as is secured from burning the gases.

Dr. Dudley said that the waste heat problem is one of the first in importance in all industries to-day. The Pennsylvania Railroad burns 30,000 tons of fuel a day and even a small saving per ton means much in a year. Tests at Altoona have shown that Pocahontas coal with 7 per cent. ash and 18 per cent. volatile matter will not evaporate as much water as Pittsburgh coal with 12 per cent. ash and 34 per cent. volatile matter. The higher volatile coals are freer burning and consequently more heat units are available.

Ira H. Woolson, chairman of the Committee on Fireproofing Material, recommended that the specification heretofore presented tentatively by his committee be now submitted to letter ballot, and it was so ordered.

A letter was read from Dr. W. W. Hillebrand, chief chemist of the Bureau of Standards at Washington, asking that the society co-operate with the bureau in the preparation of samples of various materials of construction, which shall be accepted as standards in the analysis of such materials. The bureau has already widely distributed standard samples of cast iron and steel and is about to co-operate with brass manufacturers in a similar way. The question was referred to the Executive Committee at Tuesday's evening session.

The address of President Dudley on engineering responsibility was received with marked attention and enthusiasm.

The Baldwin Locomotive Works Incorporated.

Officials of the Baldwin Locomotive Works have been elected as follows: John H. Converse, president; William L. Austin, vice-president; Alba B. Johnson, vice-president and treasurer; Samuel M. Vauclain, general superintendent; William De Kraft, secretary and assistant treasurer. A statement issued by the company reads in part as follows:

This business was founded by Matthias Baldwin in 1831. With various changes from time to time in the firm name and in the personnel of the partners, it has continued without interruption until the present time. During this period upward of 34,000 locomotives have been built and supplied to railroads throughout the United States and various foreign countries. Present partners are George Burnham, John H. Converse, William L. Austin, Samuel M. Vauclain and Alba B. Johnson. These gentlemen will comprise the officers and Board of Directors of the new corporation. The capital of \$20,000,000 which the firm has hitherto had invested in the business will be the amount of the capital stock of the new company. No stocks or bonds will be placed on the market.

The property of the company comprises the Baldwin Locomotive Works in Philadelphia, with a large branch at Eddystone, Pa., the two having a combined capacity of 2650 locomotives per annum. The same company will also own the Standard Steel Works Company, manufacturer of steel tires and rolled steel wheels, steel and iron castings, forgings and springs, located at Burnham, Milford county, Pa.

The City Council of Cincinnati has passed an ordinance by unanimous vote that on May 1, 1910, to continue until October 1, 1910, the clocks in that city are to be turned ahead one hour, thus giving employees an additional hour of daylight in the evening for recreation or other purposes.

PERSONAL

Donald Parson, sales manager of the Youngstown Car Mfg. Company, Youngstown, Ohio, has gone to his summer home in Maine for a two months' stay.

James Meehan, Jr., treasurer of the Meehan Boiler & Construction Company, Lowellville, Ohio, has gone on a European pleasure trip, to return about July 15.

August Kittleberger, who for the past 15 years has been associated with the Clayton Air Compressor Works, has been engaged by the American Air Compressor Works as superintendent of its factory in Brooklyn, N. Y., producing air compressors and vacuum pumps. The latter company's offices are in the Havemeyer Building, 26 Cortlandt street, New York.

E. W. McKeen, heretofore connected with the mechanical department of the Union Twist Drill Company, has been appointed manager of the company's New York office, 54 Warren street.

J. R. Bibbins has resigned as publicity engineer with the Westinghouse Machine Company to be associated with B. J. Arnold, director of appraisers of the Public Service Commission of New York.

Arthur Williams of the New York Edison Company has been elected a member of the Board of Trustees of the Museum of Safety and Sanitation.

R. L. Baker, a graduate of the University of Wisconsin, who has recently been connected with the department of experimental engineering, has entered the service of A. Bement, consulting engineer, Fisher Building, Chicago.

J. H. Barker, formerly sales manager in New York of the Northern Electric Mfg. Company, Madison, Wis., is now connected with the Diehl Mfg. Company, Elizabethport, N. J.

E. E. Henner of the Oliver Iron Mining Company, has been made chief engineer at Duluth. He is succeeded as engineer of the Hibbing District by Wm. M. Tilden.

O. P. Cherdon has opened an engineering and sales office for the Minneapolis Steel & Machinery Company in Dooly Block, Salt Lake City, Utah.

Jules Schirmann and L. Coin of Schneider & Co.'s steel works, Cruesot, France, who have been visiting manufacturers in this country the past four weeks, sailed for Europe June 24.

Prof. John J. Porter of the University of Cincinnati has recently returned from a three weeks' stay in the Birmingham District, where he has been conducting a furnace test of the Heacock Mountain gray ore of the Alabama Ore & Iron Company.

W. A. Reichert, for the past three years advertising manager for the Fort Wayne Electric Works, Fort Wayne, Ind., has resigned to accept a similar position with the Power & Illuminating Engineering Company, Alliance, Ohio. This company is a commercial organization co-operating with central stations to increase the day load on their plants.

George G. McMurtry, who expected to sail for Europe on the new liner Washington, has delayed his departure for about a month.

James J. Mahon, consulting engineer of the Crucible Steel Company of America, Pittsburgh, sailed for Europe June 30, on a business trip.

Clyde Calvin has been appointed superintendent of the Youngstown department of the United Engineering & Foundry Company at Youngstown, Ohio.

The Gayley Dry Air Blast in Germany.—Thyssen & Co. of Muelheim-Ruhr, who have acquired the development of the Gayley dry air blast for Germany and some other European countries, are building a plant for the Deutscher Kaiser at Bruckhausen for one furnace of 500 tons daily capacity. An extension for three additional furnaces is provided for. Preparations have gone so far that the first plant will probably be in operation before the end of the year. It is designed so that in the summer months 1500 c. m. of air per minute can be cooled

down from 25 degrees Celsius to 5 degrees below zero, the moisture being reduced from 18 grammes per cubic meter to 3 grammes. An ammonia compressor is used which is driven by a 900-hp. electric motor. Later on it is to be operated by a Thyssen gas engine. The Gayley plant is placed close to the furnaces and to the recently completed central gas engine plant, which has a total capacity of 50,000 hp. In order to test the dry blast for steel making there is being erected at the central plant a 5000-hp. Thyssen gas blowing engine for supplying the basic Bessemer steel plant with dry blast.

OBITUARY.

MILES AYRAULT, SR., who has been president of the National Roofing Company, Tonawanda, N. Y., since its organization, died June 10 after an illness of several years.

FRANK PETERSON, superintendent of the Riverside Tube Works of the National Tube Company at Benwood, W. Va., was killed in an automobile accident June 25. He was 45 years old and was a native of Sweden.

DAVID YUILE, of Montreal, Canada, president of the Belleville Iron & Horse Shoe Company, Ltd., Belleville, Ontario, Canada, died suddenly in Baltimore on June 21.

ALBERT PAULDING BRAYTON, president and founder of the Pelton Water Wheel Company, of San Francisco and New York, died at his home in Oakland, Cal., June 25, aged 82 years. He went to California in the early fifties and was conspicuous in the development of the industries of the Pacific Coast, particularly in connection with the machinery industry as applied to mining and hydro-electric development. For many years he was a member of the firm of Rankin, Brayton & Co., who operated the Pacific Iron Works, one of the pioneer concerns in the metal industry in San Francisco. He retired from that connection in 1888 and established the business of the Pelton Water Wheel Company, which, under his wise and vigorous administration, has since grown to be one of the most prominent concerns in the field of hydraulic power development.

JAMES W. LEE, for 20 years president of the Kilby Mfg. Company, founder and machinist, Cleveland, Ohio, died June 22, aged 78 years. His death was the result of injuries received several weeks before in an automobile accident. He was prominent in insurance circles as head of the firm of J. W. Lee & Co.

JAMES H. BLACKBURN, for many years a leading business man in Blair county, died at Williamsburg, Pa., last week, aged 81 years. He was long engaged in mining and shipping coal, ore and limestone, and for more than 25 years conducted large stores in various parts of Blair County. He was the father of W. W. Blackburn, secretary of the Carnegie Steel Company.

George H. Ashley of the United States Geological Survey, has prepared a treatise on Indiana coals for the report of the Indiana State Geologist, which will be issued about September. He sees in the producer gas industry a great opening for the low grade coals of that State, which until recently have been regarded as practically valueless and have been given away or thrown aside as waste. He says in his report: "It has been plainly demonstrated that not only the medium grade coals of the Mississippi Valley can be successfully used, but even the lignites and peats."

The muck bar mill of the Stewart Iron Company, Ltd., at Sharon, Pa., which has been idle for nearly two years, is being dismantled to make room for large additions to the company's blast furnace. These will consist of steel trestles and steel bins, an improved arrangement for stocking ore, and a new skip hoist. The company has mapped out ground and is making improvements to accommodate a new blast furnace, but no action has yet been taken toward its erection. The improvements now under way will cost about \$200,000 and will be completed as soon as possible.

NEWS OF THE WORKS.

Iron and Steel.

Preparations are under way for the rehabilitation of the properties of the former Southern Steel Company, and it is understood that operations will be resumed as early as is practicable.

It is announced that the operations of the Woodstock Iron & Steel Corporation will not be affected by the receivership recently appointed. The furnace of this company at Anniston, Ala., is at present out of blast for relining.

The receivers' sale of the Waynesburg Forge, Sheet & Tin Mills, Waynesburg, Pa., was postponed until Saturday, July 10. The property was offered for sale June 19, but the receivers, John H. Strawn and Carl Bolby, thought the price much too low and adjourned the sale. The highest bid received was \$17,200.

No. 5 blast furnace at the Ohio Works of the Carnegie Steel Company at Youngstown, Ohio, was put in blast Sunday evening, June 26, and the entire six blast furnaces at this plant are now in operation. Five of the 12 open hearth furnaces have been in operation for some time, and the other seven will be started as soon as they can be made ready. It is the intention of the Carnegie Steel Company to roll open hearth rails at this plant to fill orders for open hearth specifications, and it is the first time that the Ohio Works has ever been operated on open hearth rails.

Alice blast furnace of the Youngstown Sheet & Tube Company at Sharpsville, Pa., which has been undergoing repairs for some time, will resume blast early in July.

The Greenville, Pa., works of the Carnegie Steel Company, Greenville, Pa., which was idle for about 18 months, is now in full operation. The plant turns out steel bars and small shapes and has an annual capacity of about 50,000 tons.

No. 2 Isabella furnace of the Carnegie Steel Company at Pittsburgh has been put in blast after a shut down of about two weeks. No. 1 furnace at this point has been operated for some time on ferromanganese, and it is expected that No. 3 furnace will be put in operation at an early date.

General Machinery.

The National Cycle Mfg. Company, Bay City, Mich., maker of bicycles and automobile parts, is extending its main building by a three-story addition, 60 x 150 ft., which will be equipped with modern machinery as soon as it can be procured and installed. A wing, 40 x 80 ft., is also being added for a stock and shipping room and inspection work.

The Mitchell Machine & Boiler Company, Mitchell, S. D., is erecting an addition to its works and will install more machinery.

The Beloit Iron Works, Beloit, Wis.; Valley Iron Works, Appleton, Wis.; Green Bay Foundry & Machine Company, Green Bay, Wis.; and Glen Falls Machine Works, Glen Falls, N. Y., have been awarded contracts for the bulk of the machinery to be installed in the large plant of the Marathon Paper Mills Company, near Wausau, Wis.

The Standard Bridge Tool Company, Pittsburgh, builder of Thomas spacing and laying-off machines for bridge and structural shops, has shipped a spacing table to the Wisconsin Bridge & Iron Company, N. Milwaukee, Wis., and one to the Manitoba Bridge & Iron Works, Winnipeg, Man.

The Daniel H. Stoll Company, manufacturer of presses, dies, &c., will add to its plant on Military road, Lansing street and New York Central Railroad, Buffalo, N. Y., a two-story brick and steel building to cost \$15,000. Considerable new machinery, principally lathes, drills, &c., will be installed upon completion of the building; also some additional foundry equipment.

The Spaulding Mfg. Company, Grinnell, Iowa, contemplates installing additional machinery for making automobile parts, and may enlarge its plant.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., has been awarded a contract for furnishing the tables for the new 35-in. two-high reversing blooming mill which the Portsmouth Steel Company, Portsmouth, Ohio, will install in its plant.

Foundries.

The American Foundry Company, Indianapolis, Ind., has increased its capital stock from \$16,000 to \$26,000.

The plant of the Gadsden Pipe & Fittings Company, manufacturer of cast iron soil pipe, at Gadsden, Ala., will be put in operation July 5.

The J. W. Pohlman Foundry Company has been incorporated at Buffalo, N. Y., with a capital stock of \$10,000, to take over and continue the business heretofore conducted by J. W. Pohlman, with general foundry plant at East Delavan avenue and the Erie Railroad. The company's special line will be the manufacture of the Niagara stoves and ranges in addition to a general line of gray iron castings. J. W. Pohlman will be president and treasurer and W. F. Pohlman secretary.

The Syracuse Aluminum & Bronze Company, 580 Leavenworth avenue, Syracuse, N. Y., has plans under way and will

start construction this summer on a one-story brick and steel foundry building, with about 60,000 sq. ft. of floor space. The equipment for the plant will consist of a gas producer plant, cupola, gas engines and cranes.

Power Plant Equipment.

The E. Keeler Company, Williamsport, Pa., has been awarded contract by the United States Government for boilers for three separate installations at Pacific Coast fortifications. There will be two 100-hp. water tube boilers for Fort Stephens, Ore., at the mouth of the Columbia River, about 110 miles west of Portland; two 150-hp. at Fort Casey on Puget Sound, about 40 miles north of Seattle, and two 200-hp. at Fort Scott for the Presidio which adjoins the city of San Francisco, Cal. This contract was awarded after careful examination of the details of the equipment offered and a thorough investigation of the service rendered by boilers already in operation on the Pacific Coast using California oil as fuel.

The Newport Bay Electric Light & Power Company, Newport Beach, Cal., of which C. H. L. Christ is president and general manager and R. G. Christ secretary and treasurer, has been incorporated with a capital stock of \$50,000.

R. W. Oswald, 712 Machesney Building, Pittsburgh, manager of the Pittsburgh office of the Atlas Engine Works, Indianapolis, Ind., recently received six orders for engines in one week, an order coming in for an engine on each of six consecutive days. These engines will be shipped one each to a steel mill, firebrick concern, flour mill, planing mill and two to coal mines.

The Board of Aldermen of Moultrie, Ga., will receive bids until July 14 for material for the enlargement of the water system, including one horizontal compound duplex pumping engine, 429 tons of 3, 6 and 10 in. cast iron pipe, special castings, hydrants, steel or reinforced concrete tower and tank, &c.

A new pumping engine is to be purchased in the near future by the city of Dowagiac, Mich.

The City Council at Battle Creek, Mich., has authorized the expenditure of \$15,000 for a new pumping engine and other improvements at the Goguac water works station.

It is planned to install a new electric light and power plant in the works of the Du Pont Powder Company at Grosse Point, near Detroit, Mich.

A large factory, to cost about \$500,000, with power plant and complete electrical equipment, is planned for Cedar Rapids, Iowa, by Douglas & Co.

John W. Early, Columbus, Neb., is reported to be in the market for an engine and electric generator of about 125 kw. capacity.

A pumping engine is to be purchased by the city of Woodward, Iowa, which is now receiving bids for the construction of a new water works system.

Fires.

The plant of the Kings County Iron Company, 37-41 Wythe avenue, Brooklyn, N. Y., was burned June 27, the loss being about \$25,000.

The shops of the Pere Marquette Railroad at Muskegon, Mich., were damaged \$50,000 by fire June 21.

Bridges and Buildings.

The Wm. B. Scafe & Sons Company, Pittsburgh, has received a contract for the erection of a steel building, 100 x 200 ft., to be used as an extension to the machine shop at the plant of the Driggs-Seabury Ordnance Corporation, Sharon, Pa.

Advices from Muskegon, Mich., state that the Muskegon Boiler Works is to build an addition, 75 x 100 ft.

The Wisconsin Composite Brick Company, Milwaukee, has let contracts for constructing a boiler house, 47 x 74 ft.; engine house, 20 x 78 ft.; machinery building, 44 x 78 ft., and other parts of a complete new plant.

Hardware.

The Imbler Fence & Mfg. Company, Alexandria, Ind., will add new weaving machines to double the capacity of the plant. A new warehouse will be built.

The Geneva Cutlery Company, Geneva, N. Y., has plans under way and will soon start construction on a two-story addition to its factory.

Miscellaneous.

J. H. Wagenhorst & Co., Youngstown, Ohio, report an increase in their foreign trade on Wagenhorst electric blue printing machines, late shipments having been made to Norway, Sweden, Peru, S. A.; Germany, Yukon Territory, England and Brussels. Domestic trade is reported as good.

A new company in which Peter Gurtler is interested has been organized to locate a foundry and automobile factory at Onaga, Kan. Work has been commenced upon a building, 40 x 50 ft., which will be equipped for the manufacture of a car formerly made at Fredonia, Kan.

The Simplex Motor Car Company, Mishawaka, Ind., has increased its capital stock from \$200,000 to \$400,000.

I. J. Royce & Co., 133 Nebraska avenue, Chicago, Ill., which was organized several months ago for the manufacture of the Freese adjustable envelope cutter and other specialties, has been

incorporated with a capital stock of \$25,000, the purpose being to increase its manufacturing facilities.

The Cole Motor Car Company has been incorporated at Indianapolis, Ind., with \$100,000 capital stock to manufacture automobiles and other power vehicles and accessories. John F. Morrison and Joseph J. Cole are at the head of the company. A plant will be leased or built.

The Frazier Stove Company, Anderson, Ind., has increased its capital stock from \$50,000 to \$100,000. L. M. Frazier is president.

The Jewel Engineering Company, Paterson, N. J., which has been in existence for about three years, has been incorporated, with the following officers: Edmund Whittaker, president; E. Livingstone, vice-president and secretary, and F. W. Johnson, treasurer. The company does a general engineering business and is working on several patents which it expects to place on the market in the near future but which will be manufactured by contract.

The American Insulating Material Company, Alexandria, Ind., has shipped a carload of insulating blocks to Genoa, Italy, for one of the vessels of the Italian navy, part of a large contract secured by F. K. Sawyer, president of the company, during a recent trip abroad. The company has expended \$50,000 for a new steel building and machinery.

The Michigan Stamping Company, Detroit, Mich., will begin this week to rebuild its plant, which was recently destroyed by fire, the new building to be of brick and much larger than the old one. About all the mechanical equipment has been arranged for, and as it is the intention to operate by electric power no boilers or engines will be installed, except the boiler that will be installed for heating purposes.

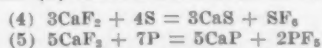
The Peninsula Milled Screw Company, Detroit, Mich., whose plant was recently destroyed by fire, has leased a building which it has already partially equipped and is operating in a small way. The company estimates that with the machinery it has already ordered, most of which is in transit, that in 30 days it will have its plant in operation on as extensive a scale as the one that was destroyed. Practically the whole force is engaged in equipping the plant and placing the machinery.

The Shreveport Creosoting Company has been incorporated at Indianapolis, Ind., with \$250,000 capital stock, to build and operate a plant to preserve railroad ties, street paving blocks and other materials by creosoting. The incorporators are K. O. Hert, Richard V. Look and Harry W. Griffith.

The Niagara Electro-Chemical Company will add to its plant on Buffalo avenue, Niagara Falls, N. Y., an experimental building, 52 x 118 ft., two stories, and a laboratory and office building, 40 x 104 ft., two stories, all to be of brick, stone and steel construction.

The Buffalo Pen Company, recently organized for the manufacture of steel writing pens under the patents of John and Bertel Gabrielson, will erect and equip a factory building on Rano street and the International Bridge Industrial branch of the Delaware, Lackawanna & Western Railroad, Buffalo, N. Y. Special automatic machines will be used, producing pens in one operation which have heretofore required three separate machines or operations.

Fluorspar in Iron and Steel Making.—In *The Iron Age* of May 27, pages 1692 to 1694, there was reproduced a paper on this subject by F. Julius Fohs of Lexington, Ky., assistant geologist of the Kentucky Geological Survey, which had been read at the New Haven meeting of the American Institute of Mining Engineers. Mr. Fohs calls attention to the fact that the paper had not been revised at the time when it was printed by the Institute and that an error of some magnitude occurred in the equations given at the end of the first paragraph. Equations (4) and (5) should have been as follows:



The American Pulley Company, manufacturer of wrought steel belt and sash pulleys and pressed steel shapes, Twenty-ninth and Bristol streets, Philadelphia, Pa., is arranging to open its Chicago store at 139 South Clinton street on July 1. In this store the company will carry a complete line of its belt pulleys and sash pulleys for distribution in the Middle West.

The Lackawanna Steel Company, Buffalo, N. Y., posted notices last week of an advance in wages, which is practically a return to the basis prevailing before the reduction made last spring.

Reports that the Alan Wood Iron & Steel Company, Conshohocken, Pa., would add a \$100,000 plate mill to its plant are denied by officers of the company.

Trade Publications.

Seamless Steel Locomotive Flues.—Detroit Seamless Steel Tube Company, Detroit, Mich. Booklet. Explains the advantages of cold drawn flue tubes and details their composition.

Lathes, Shapers, Rack Cutting Machines, &c.—Walcott & Wood Machine Tool Company, Jackson, Mich. Folio. This is a series of specifications showing the company's line of machine tools, including engine lathes ranging in sizes from 16 to 36 in. standard lathes, a 20-in. high speed crank shaper and an elliptical gear crank shaping machine, several other types of shapers and some automatic gear cutting machines. Each page shows a machine and contains brief specifications and description of it.

Belt Dressing.—Joseph Dixon Crucible Company, Jersey City, N. J. Booklet, 24 pages. Entitled "The Proper Care of Belts." Deals with the running conditions of belts and takes up the methods of preserving them. The Dixon belt dressings and their adaptability to different styles of belting are described, and suggestions as to their use are given, together with tables showing the different sizes of belts to be used for different horsepower.

Gasoline Driven Locomotives.—Milwaukee Locomotive Mfg. Company, Milwaukee, Wis. Publication No. 100, 6 x 9 in., 28 pages. Describes gasoline driven locomotives and shows standard machines in use on plantations and in installing electric railroad equipment. The more important sections of the machine are shown and tables are given showing the hauling capacity of the different sized equipment.

Insulating Materials.—The Sterling Varnish Company, Pittsburgh, Pa. Pamphlet. Devoted to insulating varnish which can be used on electrical equipment, including asbestos, porcelain switch bases, bare metal surfaces, &c., and its water repellent and oil and acid proof properties are mentioned. Directions for use are given and prices are quoted.

Graphite Products.—Jonathan Bartley Crucible Company, Trenton, N. J. Catalogue, 7 x 10½ in., 34 pages. Shows several types of crucibles, including graphite retorts, phosphorizers, crucibles for tilting furnaces, &c. Directions are given for the proper handling of crucibles, and views of injured and broken crucibles are shown with explanations of the causes of the injuries. Illustrations of the graphite mines in Ceylon are also given and the method of mining graphite is described.

Industrial Locomotives.—Ernst Wiener Company, 50 Church street, New York. Bulletin No. 150. Shows a new type of gasoline locomotive made by the company which is built to meet the needs of contractors requiring a small and inexpensive machine for drawing industrial cars. The various parts of the locomotive are shown and briefly described, and several types of industrial cars are illustrated. The locomotive was described in *The Iron Age* February 11, 1909.

Electrically Welded Products.—The Electric Welding Products Company, Cleveland, Ohio. Two booklets. One shows valve stems, driving shafts, cam shafts and connecting rods welded electrically and another illustrates electrically welded screws and bolts and lists various sizes.

Skylights.—The Drouve Company, Bridgeport, Conn. Two booklets. Skylights which are constructed without the use of putty are shown in one booklet, together with a window operator used for opening and closing them, and the other contains a reproduction of an article from the *Railroad Age Gazette*, March 19, 1909, describing the construction of the Bush terminal shed at Scranton, Pa., in which the skylights are used.

Pipe Cutting and Threading Machinery.—Curtis & Curtis Company, Bridgeport, Conn. Catalogue, 7½ x 10 in., 35 pages. The Forbes patent die stocks are shown in a number of types, including hand machines and combined hand and power machines and power machines. Power pipe cutting and threading machines are illustrated, some of which are directly connected with electric motors. The various parts of the equipment are illustrated and some space is given to pipe vises and dies.

Machine Tools and Optical Instruments.—Warner & Swasey, Cleveland, Ohio. Booklet. Deals with the company's two exhibits at the Cleveland Industrial Exposition, one consisting of machine tools and including a No. 2 hollow hexagon turret lathe and a No. 4 geared friction head turret screw machine, and the other an exhibit of astronomical instruments. The pamphlet illustrates the lathes and a prism terrestrial telescope, a prism binocular and the 36-in. Lick telescope installed at Mt. Hamilton, Cal.

Electrical Equipment.—General Electric Company, Schenectady, N. Y. Four bulletins. Bulletin No. 4661 shows aluminum lightning arresters for alternating current circuits; No. 4662 describes recording wattmeters for switchboard service; No. 4663 also deals with lightning arresters—in particular multi-gap lightning arresters for alternating currents, and No. 4669 describes Curtis steam turbines for low pressure and mixed pressure and contains a chart with curves showing tests of an engine in combination with a low pressure Curtis turbine and a chart indicating the power, output and capacity secured by installing low pressure turbine sets.

The Iron and Metal Trades

The iron and steel markets are showing numerous evidences of strength. Not only are prices advancing on both pig iron and rolled products, but manufacturers are becoming more independent. That they can again discriminate in their favors to buyers is shown by the manner in which in numerous lines the acceptance of orders at present prices is limited to specifications for early delivery. Our market reports also lay much stress on the general refusal of the mills to extend deliveries beyond the date named in the contracts. For this reason the month just closing has witnessed a spurt of old time activity in the hastening of specifications on low priced contracts for bars, plates, rods, structural shapes, &c., expiring July 1.

It is not to be expected that the immediate future will show a continuance of this great activity. Mid-summer is now at hand with its general tendency to the relaxation of effort. Apart from this, the situation shows no features of discouragement.

During the present week the United States Steel Corporation has blown in three furnaces—the South Sharon No. 1, Mingo No. 1 and Ohio No. 5. This carries the furnace capacity in operation up to 82 per cent., including in the rating four Gary furnaces.

It is reported that the International Harvester Company is feeling the pig iron market for delivery during the first half of 1910.

Agricultural implement makers find the demand exceeding their estimates. It seems certain that they will have to make additional purchases of bars and shapes.

An interesting transaction is the sale by the United States Steel Products Export Company of 9000 tons of pipe to the Anglo-Persian Oil Company for the development of the oil fields of Persia, which are practically controlled by the same interests that operate the Burmah fields. It may be noted also that the Mexican Petroleum Company is in the market for 6000 to 7000 tons of pipe, which will probably come to this country.

The labor situation is presenting some interesting features, especially in the sheet and tin plate trade. As the American Sheet & Tin Plate Company after July 1 will operate all its mills as open shops, the independent sheet and tin plate makers who have been recognizing the Amalgamated Association are seeking for more favorable terms than they have thus far been able to secure from that organization. A conference between these interests, held in Pittsburgh on Tuesday, was without result. It is understood that several leading independent manufacturers have flatly refused to sign any scales binding them for a year and will also refuse to accept any scales calling for higher rates than are paid by the leading interest. Should the sheet and tin plate mills be closed for some time to await a settlement of this question, it is understood that stocks are ample to keep consumers supplied. The contingency has been foreseen and due preparations were made. The contention between the Republic Iron & Steel Company and the Amalgamated Association seems to be of a character admitting of early and amicable adjustment.

Contracts for rails placed during the past week have not been large, but it is understood that the railroad companies have been placing orders for a considerable number of steel cars, so that their influence as buyers is being felt in important branches of the steel trade.

Among the structural contracts closed during the week were 9000 tons for the Post Office at the Pennsylvania Terminal in New York, which was secured by the Pennsylvania Steel Company; 3000 tons for the Hunnewell street viaduct on the Long Island Railroad; 3000 tons for the Willamette River bridge; 4000 tons for the Hewitt-Bryce Building, and a considerable number of smaller pieces of work in various portions of the country. Building projects continue to come forward in all sections and the outlook is decidedly favorable.

Pittsburgh reports a sale of 25,000 tons of standard Bessemer pig iron made by the Bessemer Pig Iron Association to the Jones & Laughlin Steel Company for third quarter delivery at \$16.15, delivered. This is the largest sale of Bessemer iron made in the Pittsburgh District for many months.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June30, 1909.	June23, 1909.	May26, 1909.	June24, 1908.
FIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$16.50	\$16.50	\$16.25	\$16.50
Foundry No. 2, Southern, Cincinnati	15.25	14.75	14.50	15.25
Foundry No. 2, local, Chicago ..	16.50	16.50	16.50	17.85
Basic, delivered, eastern Pa.	15.50	15.50	15.50	15.25
Basic, Valley furnace	15.00	15.00	14.25	15.25
Bessemer, Pittsburgh	16.15	16.15	15.90	16.90
Gray forge, Pittsburgh	14.90	14.90	14.40	14.90
Lake Superior charcoal, Chicago ..	19.50	19.50	19.50	20.00

BILLETS, &c., Per Gross Ton:				
Steel billets, Pittsburgh	23.00	23.00	23.00	25.00
Forging billets, Pittsburgh	27.00	26.00	25.00	27.00
Open hearth billets, Philadelphia ..	25.00	25.00	24.50	26.20
Wire rods, Pittsburgh	29.00	29.00	29.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	14.50	14.50	14.25	12.50
Steel rails, melting, Philadelphia ..	16.00	16.00	15.25	13.50
Iron rails, Chicago	17.00	17.00	17.00	15.50
Iron rails, Philadelphia	19.50	19.50	18.50	18.00
Car wheels, Chicago	16.00	16.00	15.00	13.00
Car wheels, Philadelphia	15.25	15.00	15.00	13.50
Heavy steel scrap, Pittsburgh	16.00	15.75	15.50	13.25
Heavy steel scrap, Chicago	14.50	14.50	14.00	11.50
Heavy steel scrap, Philadelphia ..	16.00	16.00	15.25	13.50

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia ..	1.45	1.45	1.40	1.40
Common iron bars, Chicago	1.35	1.35	1.30	1.50
Common iron bars, Pittsburgh ..	1.45	1.40	1.30	1.40
Steel bars, tidewater, New York ..	1.41	1.36	1.36	1.56
Steel bars, Pittsburgh	1.25	1.20	1.20	1.40
Tank plates, tidewater, New York ..	1.46	1.41	1.46	1.76
Tank plates, Pittsburgh	1.30	1.25	1.30	1.60
Beams, tidewater, New York	1.46	1.41	1.46	1.76
Beams, Pittsburgh	1.30	1.25	1.30	1.60
Angles, tidewater, New York	1.46	1.41	1.46	1.76
Angles, Pittsburgh	1.30	1.25	1.30	1.60
Skelp, grooved steel, Pittsburgh ..	1.30	1.30	1.30	1.45
Skelp, sheared steel, Pittsburgh ..	1.40	1.40	1.40	1.50

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh ..	2.20	2.20	2.20	2.50
Wire nails, Pittsburgh	1.70	1.70	1.70	1.95
Cut nails, Pittsburgh	1.65	1.65	1.65	1.75
Barb wire, galv., Pittsburgh	2.00	2.00	2.00	2.40

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	33.37½	33.25	33.50	33.00
Electrolytic copper, New York ..	33.12½	33.00	33.25	32.87½
Spelter, New York	5.35	5.40	5.20	4.55
Spelter, St. Louis	5.27½	5.27	5.05	4.40
Lead, New York	4.35	4.35	4.40	4.50
Lead, St. Louis	4.30	4.20	4.30	4.40
Tin, New York	29.15	29.05	29.15	27.60
Antimony, Hallett, New York	7.50	7.50	7.75	8.50
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	\$3.64	\$3.64	\$3.64	\$3.89

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 20c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.30c. to 1.35c., net; I-beams over 15 in., 1.40c., net; H-beams over 8 in., 1.50c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.35c., net; angles, over 6 in., 1.40c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.50c., base, half extras, steel bar card; tees, 3 in. and up, 1.40c., net; tees, 3 in. and up, 1.35c., net; angles, channels and tees, under 3 in., 1.25c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.60c., net; hand rail tees, 2.70c., net; checkered and corrugated plates, 2.70c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.30c. to 1.35c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered $\frac{1}{4}$ -in. plate. Steel plates over 72 in. wide must be ordered $\frac{1}{4}$ -in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under $\frac{1}{4}$ -in. to and including 3-16-in. plates on thin edges.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
All sketches (excepting straight taper plates varying not more than $\frac{1}{4}$ in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete circles.....	.20
Boiler and flange steel plates.....	.10
"A. B. M. A." and ordinary firebox steel plates.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in.....	.05
For widths over 110 in. up to 115 in.....	.10
For widths over 115 in. up to 120 in.....	.15
For widths over 120 in. up to 125 in.....	.25
For widths over 125 in. up to 130 in.....	.50
For widths over 130 in.....	1.00

TERMS.—Net cash 30 days, Pacific Coast base, 1.30c., f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.25c.; No. 30, 3.60c. Painted roofing sheets, No. 28, 1.55c. per square. Galvanized roofing sheets, No. 28, 2.80c. per square for $2\frac{1}{2}$ -in. corrugations.

Wrought Pipe.—Discounts on steel pipe, $\frac{3}{4}$ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, $\frac{3}{4}$ to 6 in., are 78 and 5 per cent. off list.

Boiler Tubes.—Regular discounts are as follows:

Boiler Tubes.	Steel.
1 to $1\frac{1}{4}$ in.....	.50
$1\frac{1}{4}$ to $2\frac{1}{4}$ in.....	.62
$2\frac{1}{4}$ to 5 in.....	.70
$2\frac{1}{2}$ in.....	.64
6 to 13 in.....	.62
$2\frac{1}{2}$ in. and smaller, over 18 ft. long, 10 per cent. net extra.	
$2\frac{3}{4}$ in. and larger, over 22 ft. long, 10 per cent. net extra.	

Wire Rods.—Bessemer rods, \$29; chain rods, \$29; basic rods, \$29 to \$30.

Chicago.

FISHER BUILDING, June 30, 1909.—(By Telegraph.)

The heaviest tonnage of new business in finished material placed last week came from the railroads in the form of track fastenings of which in tie plates alone the Illinois Steel Company entered 13,000 tons. Further heavy purchases of track fastenings are expected to follow as a result of the recent rail orders placed by the Harriman lines. Specifications against contracts for bars, plates and structural shapes expiring July 1 have in the past few days been crowded forward owing to the fact that the mills have signified their intention of canceling all low priced tonnage unspecified at the date of expiration. Refusal to extend deliveries beyond date of contract points conclusively to the existence of a more stable market and the anticipation of a rising tendency in prices. Some difficulty is encountered in securing prompt deliveries, especially on the heavier lines of rolling mill products, but the extent of the delay thus far experienced has not resulted in any serious inconvenience to consumers. The possibility of a suspension of operations in a number of the Western bar iron mills through failure to effect a settlement of wage scales has been averted by the harmonious adjustment of this matter at a meeting held last week between the Western Bar Iron Association and the Amalgamated Association. Signs of weakness are rapidly disappearing in all divisions of the market, and while some letup in the present demand is looked for in July and possibly in August, rolling schedules are well enough filled up to relieve any anxiety on this account.

Pig Iron.—The market shows little activity so far as actual buying is concerned. There is some demand for malleable Bessemer, one lot of 1000 tons having been taken last week by a foundry connected with the agricultural implement trade. Sales generally were confined to small requirements. There are, however, some round lot inquiries in the market, the largest of which, including 10,000 tons of foundry iron for last half delivery, is from an agricultural implement concern. The price on Southern iron has settled firmly at \$12, Birmingham, and sellers in this market stoutly maintain that this figure is not being shaded even on orders for prompt shipment. There is no change in the situation respecting Northern furnaces except that \$16 at furnace is now generally accepted as the absolute

minimum on iron for third quarter delivery, while on exclusively fourth quarter business some leading producers are asking \$16.50. A decidedly firmer tone exists throughout the entire market. The following prices are for July, August and September delivery, f.o.b. Chicago:

Lake Superior charcoal.....	\$19.50 to \$20.00
Northern coke foundry, No. 1.....	17.00 to 17.50
Northern coke foundry, No. 2.....	16.50 to 17.00
Northern coke foundry, No. 3.....	16.00 to 16.50
Northern Scotch, No. 1.....	17.50 to 18.00
Southern coke, No. 1.....	16.85 to 17.35
Southern coke, No. 2.....	16.35 to 16.85
Southern coke, No. 3.....	15.85 to 16.35
Southern coke, No. 4.....	15.35 to 15.85
Southern coke, No. 1 soft.....	16.85 to 17.35
Southern coke, No. 2 soft.....	16.35 to 16.85
Southern gray forge.....	14.85 to 15.35
Southern mottled.....	14.60 to 15.10
Malleable Bessemer.....	16.50 to 17.00
Standard Bessemer.....	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6 %.....	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8 %.....	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10 %.....	21.90 to 22.40

(By Mail.)

Billets and Rods.—No transactions of importance in forging billets are reported, but there is an inquiry in the market for 1000 tons. The market seems to range between \$26 and \$27, base, Chicago, with a stronger leaning toward the latter figure. A good tonnage of specifications against recent contracts for axle billets placed is coming to the mills. Wire rod specifications are coming out freely, and there is some new buying.

Rails and Track Supplies.—Instead of centering upon rails, as has been the case for several weeks, railroad buying has turned to track fastenings. One of the large Western systems has placed an order with the Illinois Steel Company for 10,000 tons of tie plates, which is in addition to a like amount placed earlier in the season. Other orders for tie plates from Western roads aggregating 3000 tons went to the same company. Inquiries are out from the Northern Pacific for 600,000 tie plates, amounting to about 3000 tons. Specifications for spikes and bolts are very heavy. New rail tonnage entered since last report is limited to scattered orders, of which the Illinois Steel Company booked 3000 tons, while 1000 tons of 70-lb. went to an Eastern mill. Business in light rails is considerably improved. More light rail tonnage has been booked in June for the No. 2 mill at South Works than at any previous month for a year. We quote on light rails as follows: 40 to 45 lb. sections, \$26; 30 to 35 lb., \$26.75; 16, 20 and 25 lb. \$27; 12-lb., \$28, Chicago, less 50c. a ton on lots under 500 tons and \$1 a ton on lots over 500 tons.

Structural Material.—Last week's closures of fabricating contracts included none of the larger projects now under consideration. Quite a number of small orders were entered. The Chicago, Milwaukee & St. Paul placed 1400 tons of bridge material, divided between the McClintic-Marshall Construction Company and the Minneapolis Steel & Machinery Company, the former taking 900 tons and the latter 500 tons. The Chicago & Northwestern distributed 725 tons between Worden-Allen Company and the Modern Steel Construction Company. The contract for 500 tons required for the Las Vegas (Nevada) shops of the Salt Lake City, San Pedro & Los Angeles Railroad was taken by the Llewellyn Iron Works. The White Building, 389 tons, and the Spreckles Theatre, 388 tons, San Francisco, have both been let. None of the more important local work upon which figures have been taken was included in the week's business. Specifications for fabricated material are plentiful. The mills likewise are receiving a large volume of tonnage in specifications against contracts. Practically all of the mills are notifying customers that on all low priced contracts expiring July 1 the tonnage remaining unspecified on that date will be canceled. The local mills are not promising shipment earlier than three to four weeks from receipt of order. Prices on store shipments were last week advanced \$1 a ton by all of the leading jobbers, who are now holding at 1.70c., base. Mill prices are unchanged, and are very firm at 1.48c., Chicago.

Plates.—In addition to the heavy tonnage of specifications coming out a fair amount of new business is being placed. Some fair sized orders have recently come from the local car shops, which are gradually getting more active. An order for 5200 cars, said to have been placed by the Harriman lines, is understood to have been distributed between three of the leading car shop interests. Several other roads now in the market will likely place orders soon for lots of 500 to 1000 cars, and considerable more plate tonnage is expected from this source. Jobbers are specifying heavily against existing contracts, and their stocks are moving better than for some time. Store prices have been advanced \$1 a ton to a basis of 1.70c. on store shipments, and this price, it is reported, is absolutely maintained. The South Works mills are running from three to four weeks behind on deliveries, but some slacking in demand is looked for during July and August. Mill prices are firm at 1.48c., Chicago.

Sheets.—The gradual increase in demand for sheets has had a strengthening effect upon prices, which are now subject to but little concession. Prices are especially firm on

prompt shipments, which are not now obtainable from all makers. The best delivery offered by the local mill on galvanized and box annealed is from five to six weeks and on blue annealed from six to seven weeks. Car roofing sheets are in better demand. The Great Northern Railway has an inquiry out for three carloads of roofing sheets, and a better run of orders is expected to follow the continued expansion of car building.

Bars.—At the meeting of the Western Bar Iron Association and the Amalgamated Association held last week a settlement of the wage scale was effected. With the exception of one clause, which was slightly amended, no important changes, it is stated, were made. Bar iron prices have firmed up somewhat, and 1.35c., Chicago, is now recognized as minimum on deliveries within the next 60 days. On contracts further ahead 1.40c. is being asked by most of the mills. Owing to the fact that some of the Western mills will shut down for inventory and repairs for at least two weeks beginning July 1, more orders for immediate shipment are being placed and the mills are running fuller than for several months. There is little new demand for steel bars, but specifications continue fairly heavy. The leading interest is not promising better than 30-day deliveries, with the prospect that they will become more extended. An advance of \$1 a ton made by local jobbers last week fixes the rate on store shipments at 1.60c., Chicago. Mill prices are reported as absolutely firm at 1.38c., Chicago.

Merchant Pipe.—Trade in merchant pipe holds practically even as to volume. Buyers continue to cover their requirements for not more than 30 days ahead. Because of the regularity and promptness with which mills are able to execute and ship orders, more extended anticipation of requirements is at present unnecessary. There is no change in prices, which are reported to be well maintained.

Boiler Tubes.—The growth of demand from contract and railroad boiler shops is very slow, and there is comparatively little business moving. Trade is restricted to occasional carload orders from mill and the smaller lots from store.

Cast Iron Pipe.—Although no award of the 2500 tons for Cincinnati, on which bids were opened last week, is reported, it is stated that the Dimmick Pipe Company was the low bidder; 550 tons purchased for Mount Healthy, a suburb of that city, went to the United States Cast Iron Pipe & Foundry Company. A general contract let by Auburn, Kan., which included 700 tons of pipe, was taken by the Kratz & Craig Construction Company, Omaha. Beyond the usual run of routine orders for water works extensions and repair work, there is little new business in the market. We quote per net ton, Chicago, as follows: Water pipe, 4 in., \$27.50; 6 to 12 in., \$26.50; 16 in. and up, \$25.50, with \$1 extra for gas pipe.

Old Material.—Trade in old material seems to have reached a halting point so far as the dealers are concerned. Consumers are apparently well supplied, and there is no urgent demand in any quarter. The railroad lists offered last week were disposed of at slightly lower prices than had been realized on recent sales. A lot of about 350 tons of car wheels was taken by a consumer at \$16 on connecting line. The rolling mills are buying only such odd lots as can be picked up at advantageous prices. A list of about 3500 tons will be closed by the Rock Island this week, of which a considerable portion is wrought scrap. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails.....	\$17.00 to \$17.50
Old steel rails, rerolling.....	15.50 to 16.00
Old steel rails, less than 3 ft.....	14.50 to 15.00
Relaying rails, standard sections, subject to inspection.....	22.50 to 23.50
Old car wheels.....	16.00 to 16.50
Heavy melting steel scrap.....	14.50 to 15.00
Frogs, switches and guards, cut apart.....	14.50 to 15.00
Mixed steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates.....	\$15.75 to \$16.25
Iron car axles.....	18.50 to 19.00
Steel car axles.....	17.25 to 17.75
No. 1 railroad wrought.....	13.25 to 13.75
No. 2 railroad wrought.....	12.25 to 12.75
Springs, knuckles and couplers.....	13.25 to 13.75
Locomotive tires, smooth.....	14.75 to 15.25
No. 1 dealers' forge.....	11.00 to 11.50
Mixed bushing.....	7.75 to 8.25
Steel axle turnings.....	9.75 to 10.25
Machine shop turnings.....	8.00 to 8.50
Cast borings.....	6.00 to 6.50
Mixed borings, &c.....	6.00 to 6.50
No. 1 mill.....	7.00 to 7.50
No. 2 mill.....	6.00 to 6.50
No. 1 boilers, cut to sheets and rings.....	10.25 to 10.75
No. 1 cast scrap.....	13.50 to 14.00
Stove plate and light cast scrap.....	11.50 to 12.00
Railroad malleable.....	13.00 to 13.50
Agricultural malleable.....	11.25 to 11.75
Pipes and flues.....	9.50 to 10.00

Metals.—The market is extremely quiet, there being little new demand from any source. Copper is especially dull, and there is no movement of note in lead or spelter. Prices, however, remain practically unchanged throughout the list. Like conditions exist in old metals, which are

equally inactive. Quotations are as follows: Casting copper, 13½c.; lake, 14c., in car lots, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, car lots, 31c.; small lots, 33c.; lead, desilverized, 4.50c. to 4.60c., for 50-ton lots; corroding, 4.75c. to 4.85c., for 50-ton lots in car lots, 2¼c. per 100 lb. higher; spelter, 5.45c. to 5.50c.; Cookson's antimony, 10½c., and other grades, 9¾c. to 10¼c.; sheet zinc is \$7, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11¾c.; copper clips, 12½c.; red brass, 12c.; yellow brass, 9¾c.; light brass, 7c.; lead pipe, 4¼c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 23c.; block tin pipe, 26c.

Philadelphia.

PHILADELPHIA, PA., June 29, 1909.

While a somewhat smaller volume of business has been transacted in pig iron, sales of rolled products are numerous, and the market for all grades of both crude and finished materials is strong, with prices showing an upward movement. Some sellers of pig iron have advanced prices about 25 cents a ton, while most makers of plates and shapes refuse to accept business unless specifications accompany orders. A lull in buying is expected for a few weeks, as the usual midsummer inventories and shutdowns for repairs, &c., will be made at a number of plants. Activity on the part of the railroads, both in the buying of rails and rolling stock, is encouraging, and the outlook for business, considering the season of the year, is good.

Pig Iron.—Transactions have been on a somewhat smaller scale, as is customary at this season of the year. The most important in this territory was the placing of orders for an aggregate of 8100 tons of pig iron by the Pennsylvania Railroad; 6000 tons of coke, analysis iron, and 2100 tons of charcoal iron, at prices reported slightly under the market. Foundry grades have been taken in moderate lots for reasonably prompt delivery at \$16.50 to \$16.75, delivered, for No. 2 X. An advance of 15c. to 25c. a ton has been announced for third quarter delivery by a number of sellers. The Lehigh Valley furnaces, which are particularly active in this movement, have named \$16, at furnace, as their flat price for No. 2 X foundry, for third quarter, this being equal to from \$16.65 to \$16.75, delivered in this vicinity. This grade can, however, still be had from makers who are not so extensively sold up at \$16.50, delivered during July and August, but the quantity available at that price is said to be limited. No. 2 plain foundry has figured quite actively in the week's sales, this grade commanding, as a rule, \$16, with a few sales reported at \$16.25, delivered. The demand for low grade irons is still quite heavy, the cast iron pipe foundries in this territory being in the market for an aggregate of close to 20,000 tons; but very little is to be had at buyers' ideas of prices, which range from 25c. to 50c. below those of sellers. Virginia foundry grades have been somewhat more active, sales of a number of moderate lots of No. 2 X and No. 2 plain being reported at the market. Prices are being well maintained. The demand for forge iron has been less active, owing to the usual midsummer suspension of the mills. There is, however, little of this grade being offered and prices are firmly held. One inquiry for 8000 tons of basic iron has been before the trade from an Eastern steel mill for September delivery. Sellers hold firmly at \$15.50 for such delivery. The local demand for low phosphorus iron has been comparatively dull; one seller, however, disposed of a lot of several thousand tons for Western shipment, at unchanged prices. The announced advance in prices may check buying to some extent until the trade knows that the advances will be maintained. The available tonnage at the old basis will, however, have to be disposed of before the advance becomes general. The following range of prices for standard brands, third quarter, delivered in buyers' yards, eastern Pennsylvania and nearby points, is named:

Eastern Pennsylvania, No. 2 X foundry.....	\$16.50 to \$16.75
Eastern Pennsylvania, No. 2 plain.....	16.00 to 16.25
Virginia, No. 2 X foundry.....	16.50 to 17.00
Virginia, No. 2 plain.....	16.25 to 16.75
Gray forge.....	15.25 to 15.50
Basic.....	15.50
Low phosphorus.....	19.50 to 20.00

Ferromanganese.—The market appears to be gradually becoming stronger. There has not been any particular demand from consumers in this territory, although sales in moderate lots for Western shipment, both for last half of this year and first half of 1910, have been reported at slightly higher figures. For shipment over the balance of the year \$41.50 to \$42, f.o.b. Baltimore, is being quoted, while for the first half of next year, \$42.50 to \$43.50 is named.

Billets.—There has been some inquiry for forward shipment, but makers are not anxious for such business, except at advanced prices. Prompt rolling billets can be had at \$25 to \$25.50 delivered, and some small business has been done at those figures. A good share of the recent demand has been for special analysis steel, which commands a slight premium. Forging steel takes the usual advance of \$2 a

ton, the customary extras applying for high carbons and special sizes.

Plates.—The demand continues active and the mills are booking heavier tonnages. A larger productive capacity is to be noted in several instances. Consumers would contract for heavy tonnages, but a number of mills refuse to accept business at current prices except when orders are accompanied by specifications. Orders of considerable size have been taken by Eastern mills for boat and bridge steel and a good volume of business is in sight. While there is no change in prices, 1.45c. to 1.55c. being named for ordinary plates delivered in this territory, they apply to a large extent on prompt business only.

Structural Material.—The Philadelphia & Reading Railway has placed a contract for 1200 tons of bridge work for its Ninth street elevated with Lewis F. Shoemaker & Co. of this city. The American Bridge Company was the low bidder for 3500 tons of bridge work, under contract No. 11, for further work on the same job, but the formal contract for the work has not yet been placed. Structural mills in the East are taking a good volume of business and are unable to make deliveries as promptly as heretofore. The market is strong and prices are being fully maintained at 1.45c. to 1.55c., according to specification, for delivery in this territory.

Sheets.—An increased tonnage of business has been placed during the week; in many instances, however, to cover requirements during the coming suspension of mills. Very little business for forward delivery is on sellers' books, nearly all orders being for prompt shipment at unchanged prices, which for delivery in this territory range as follows: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

Bars.—There is a trifle more business around, consumers buying for their near future requirements, covering the usual suspension of mills during the coming month. The tonnages taken, however, are not large, although the leading mills are getting somewhat better prices, ranging from 1.45c. to 1.50c., delivered in this territory. Lower prices, however, are still being named by some mills, making a limited range of sizes. The movement in steel bars is not very heavy, prices ranging from 1.40c. to 1.45c., delivered.

Coke.—More activity is to be noted, some contracts having been made for delivery extending until April, 1910. Some business in furnace coke has been done at \$1.65 to \$1.75, at oven, while foundry coke commands \$2.10 to \$2.25, at oven, depending on tonnage, delivery and grade. For delivery in this territory quotations range as follows:

Connellsville furnace coke.....	\$3.90 to \$4.10
Foundry coke.....	4.35 to 4.50
Mountain furnace coke.....	3.50 to 3.70
Foundry coke.....	3.80 to 4.10

Old Material.—The market is quiet, transactions being usually in comparatively small lots. Dealers still refuse to let any important tonnages go at the present price level, and, notwithstanding the fact that business has been rather light, prices are strong in nearly every grade. The only weak spot has been in No. 1 railroad wrought, which has declined about 50c. a ton. A few sales of heavy melting steel in 500-ton lots have been reported at \$16, delivered, but no large tonnages are offered. While prices are to some extent nominal, the following range about represents quotations for delivery in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops.....	\$16.00 to \$16.50
Low phosphorus.....	20.00 to 20.50
Old steel axles.....	21.00 to 21.50
Old iron axles.....	23.25 to 24.00
Old iron rails.....	19.50 to 20.50
Old car wheels.....	15.25 to 15.75
Choice No. 1 R. R. wrought.....	17.50 to 18.00
Machinery cast.....	15.00 to 15.50
Railroad malleable.....	14.50 to 15.00
Wrought iron pipe.....	15.50 to 16.00
No. 1 forge fire scrap.....	13.50 to 14.00
No. 2 light iron.....	9.50 to 10.00
Wrought turnings.....	12.50 to 13.00
Stove plate.....	12.50 to 13.50
Cast borings.....	10.50 to 11.00
Grate bars.....	13.50 to 14.00

Birmingham.

BIRMINGHAM, ALA., June 28, 1909.

Pig Iron.—Quotations now ruling are 50c. per ton higher than at the time of last report, with indications favorable for their maintenance. The feature of the past week's events was the temporary withdrawal from the market of the only producing interest that has adhered to the schedule of \$11.50 Birmingham for entire last half deliveries. By the action just referred to, the available tonnage for third quarter, or prompt shipment, was left practically in the hands of two concerns. The quotation of \$12 Birmingham for No. 2, which has been established, is understood to apply only to third quarter deliveries, but it is probable that the price could be made to apply to last half, notwithstanding the fact that two of the leading interests ask a premium of 50c. per ton for such delivery. For early shipments the \$12

basis cannot be shaded. In one instance an effort to secure 5000 tons at \$11.50 per ton, for shipment within 60 days, was unsuccessful, and the fact that those figures became very attractive before the advance is indicated by the number of telegraphic acceptances recorded. There have as yet been no sales of special significance effected at the advanced price, but on favorite brands in comparatively small lots the further advance of 50c. per ton for strictly last quarter shipment does not prohibit engagements. It is noted that but few of the producing interests are solicitous of last quarter commitments, and the number of recent requests to anticipate deliveries of third quarter engagements is such as to indicate a gradual permanent increase in the consumption. The producing capacity now idle is in practically all cases being repaired, and the consensus of opinion of the best authorities favors a normal rate of production at a not far distant date.

Cast Iron Pipe.—It is understood that 3000 tons of water pipe, on contract just awarded by the city of Cincinnati, Ohio, will be furnished by the Dimmick Pipe Company, Birmingham, Ala. To the list of prospective lettings there is no addition, but the aggregate of small lots for maintenance work is attractive and producers generally are well supplied with orders. The aggregate of small orders pending at this time is roughly estimated at 7500 to 10,000 tons. There is no change in quotations, and in view of the recent advance in the price of pig iron local producers are inclined toward a higher basis. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$25; 8 to 12 in., \$24; over 12 in., average \$23, with \$1 per ton extra for gas pipe.

Old Material.—Transactions of the past week are not dissimilar to those recorded during the week previous. Dealers adhere to quotations and expect to move the accumulations at even better prices than are asked, but consumers are slow to take hold, other than for bargain lots. Dealers' prices are as follows, per gross ton, f.o.b. cars here:

Old iron rails.....	\$13.50 to \$14.00
Old iron axles.....	14.50 to 15.00
Old steel axles.....	12.00 to 12.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.00 to 10.50
No. 1 country wrought.....	9.00 to 9.50
No. 2 country wrought.....	8.50 to 9.00
No. 2 machinery.....	10.50 to 11.00
Tram car wheels.....	10.50 to 11.00
Standard car wheels.....	12.00 to 12.50
Stove plate and light cast.....	8.50 to 9.00
Cast borings.....	4.00 to 4.50

Cincinnati.

CINCINNATI, OHIO, June 30, 1909.—(By Telegraph.)

The first half of the year closes in this market satisfactorily with all interests, crude and finished alike. In the machine tool line, some especially good inquiries have come in the early mails of the week, and the larger establishments report the closing week of June the best of the month. The jobbing foundries are rapidly getting into normal conditions of melt; the largest to-day purchased 1000 tons of foundry iron for delivery over the remainder of the year. Agents of the finished material makers are not actively seeking business because of restrictive instructions from headquarters and prices on everything seems to be hardening.

Pig Iron.—The routine of the iron market to-day has shown for the first time characteristics of the 1907 June, and some good sized transactions have been closed in the last two days by wire and long distance telephone. The Southern market is firm at \$12 flat, Birmingham, one large interest asking \$12.50, while several have entirely withdrawn for the third quarter. A sale of Nos. 3 and 4 foundry, 500 tons of each, for immediate delivery, at \$11.50, Birmingham, to a prominent pipe interest, establishes a new standard of valuation on low grades, and will probably influence that particular market for some days. It is reported here that one of the largest Southern furnace interests has sold 40,000 tons of iron in the past six days, for delivery over the remainder of the year. For a June record one of the largest pig iron concerns here reports an average sale of 5000 tons per day, against 8000 tons for May, which is considered excellent under the circumstances. Some forge iron is wanted by a melter in Chattanooga territory, but aside from this the demand does not seem as strong as a few weeks ago, and this grade can probably be bought at between \$10.50 and \$10.75, Birmingham. In the local district the range is the same, namely, \$14.50 to \$15, Iron-ton, with but one interest, producing special iron, asking the higher price. But three furnaces are in blast in this district—Nellie, Iron-ton Iron and Ashland—and there are still some big stocks on furnace yards, which, however, are subject largely to contract shipments. Basic is stronger. It is quoted at about \$12, Birmingham. The leading agricultural interest is said to be in the market for a heavy tonnage of foundry iron, and the leading soil pipe interest is also buying heavily. A central Ohio concern to-day asks for 1000 tons of Southern and 500 of Northern foundry for delivery over the last half. The local foundry, which has been negotiating for some time, to-day bought 1000 tons of Northern and Southern special

analysis iron at a price said to be a shade under \$12. Leading sellers in this field predict a \$13 minimum market by August 1. For early delivery, based on freight rates of \$3.25 from Birmingham and \$1.20 from the Hanging Rock District, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry.....	\$15.75
Southern coke, No. 2 foundry.....	15.25
Southern coke, No. 3 foundry.....	\$14.50 to 14.75
Southern coke, No. 1 soft.....	15.75
Southern coke, No. 2 soft.....	15.25
Southern coke, gray forge.....	13.50 to 13.75
Ohio silvery, 8 per cent. silicon.....	19.70
Lake Superior coke, No. 1.....	15.95 to 16.20
Lake Superior coke, No. 2.....	15.70
Lake Superior coke, No. 3.....	14.95 to 15.20
Standard Southern car wheel.....	22.25 to 23.25
Lake Superior car wheel.....	20.75 to 21.75

(By Mail.)

Coke.—Furnace coke is dull, contracting being for the most part finished for the six months' and year's period. A furnace in the Ironton District has been seeking a supply of Pocahontas for the last half. This furnace being now out of blast, it is argued that arrangements are being made for blowing it in at an early date. There is obtainable some July and August furnace coke (Pocahontas) at about \$1.60, at oven, but over the balance of the year \$1.65 to \$1.75 is named. Connellsville foundry grades are still quotable at \$2 to \$2.25 on contract, and Wise County grades on about the same basis. Pocahontas foundry is quotable at \$2 to \$2.10, with some shading on immediate deliveries at the former price.

Structural Material.—Shapes are firm, at 1.30c., Pittsburgh, and some interests are asking 1.35c. to 1.40c. An Eastern interest represented here, which has an advantage in freight rates west of Pittsburgh, has been securing some excellent business in the South at a price of something like 1.30c., at mill. The largest building project requiring structural steel noted this week is in Nashville, and the Sneed Architectural Iron Works of Louisville are said to have the contract for the material—1800 tons. All local concerns handling structural iron and steel are figuring on some good business during the summer and fall. A number of minor building operations requiring steel shapes in small lots are now in process of construction, and the run of small orders is quite good.

Bars and Sheets.—The quoted price of 1.25c., Pittsburgh, on steel bars is maintained, but is firmer, and the run of small orders is increasing. Some extra buying has been noted to cover requirements of the midsummer shutdown period of the mills. The demand for iron bars is improving, and all local mills are fairly busy. The average price is about 1.35c. to 1.40c., and a considerable part of the output is going into railroad repair work. There is no change in the sheet situation; all mills in this territory are busy and seem satisfied with the outlook.

Old Material.—There is very little movement in scrap as compared with the indications and general outlook from the first of the month. The hot weather has seemed to embarrass the interests in old metal, and prices are from 25c. to 50c. off on many items. There are indications of interest in relayers, which should develop soon with the heavy buying of new rails by the various railroads. For delivery, f.o.b. cars Cincinnati, dealers' quotations are about as follows:

No. 1 R. R. wrought, net ton.....	\$14.00 to \$14.50
Cast borings, net ton.....	6.50 to 7.00
Heavy melting steel scrap, gross ton...	13.50 to 14.50
Steel turnings, net ton.....	9.00 to 9.50
No. 1 cast scrap, net ton.....	13.50 to 14.00
Burnt scrap, net ton.....	9.50 to 10.50
Old iron axes, net ton.....	17.50 to 18.00
Old iron rails, gross ton.....	15.00 to 15.50
Old steel rails, short, gross ton.....	13.50 to 14.00
Old steel rails, long, gross ton.....	13.50 to 14.00
Relaying rails, 56 lb. and up, gross ton.	21.50 to 22.00
Old car wheels, gross ton.....	14.50 to 15.00
Low phosphorus scrap, gross ton.....	13.50 to 14.00

J. K. Dimmick & Co., sellers of coal, coke and pig iron, whose general offices are in the Land Title Building, Philadelphia, Pa., announce that they have opened a branch sales office at 53 Pickering Building, Cincinnati, Ohio. E. S. Kendrick is resident manager.

Buffalo.

BUFFALO, N. Y., June 29, 1909.

Pig Iron.—The market continues moderately active as to new business, with large specifications on contracts, and shows a steady and notable improvement toward greater strength from week to week and the resumption of healthy and normal conditions. Furnaces in the Buffalo District are now operating nearly to capacity and daily shipments are increasingly heavy. Reports indicate that foundries drawing supplies from this district are much busier than had been anticipated, and a noteworthy feature at present is the supplementary buying by consumers who had supposed their requirements were covered but are coming into the market for additional supplies. The ruling prices for prompt and third

quarter deliveries are as follows, f.o.b. Buffalo, with slightly higher quotations for fourth quarter:

No. 1 X foundry.....	\$15.25 to \$15.75
No. 2 X foundry.....	15.00 to 15.25
No. 2 plain.....	14.75 to 15.00
No. 3 foundry.....	14.25 to 14.75
Gray forge.....	14.25 to 14.50
Malleable Bessemer.....	15.00 to 15.50
Basic.....	15.50 to 16.00
Charcoal.....	19.50 to 20.00

Finished Iron and Steel.—The leading interest reports uninterrupted booking of large tonnages of bars, plates and shapes at prices in force before the advance made by the independent interests, while many of the latter report they are closing as much business as they can handle at the higher prices they have put in effect—namely, 1.25c., Pittsburgh, for bars, and 1.35c. for plates and shapes—from current buyers, who were not under contract at the old rate, and deliveries are becoming more and more extended. Orders for railroad material are increasing noticeably. The Lackawanna Steel Company this week received an order from the Buffalo, Rochester & Pittsburgh Railroad for 1000 tons of standard rails in addition to other large orders. There is considerable movement in rails for electric roads. Structural material orders keep up well. The American Bridge Company has taken contract for 200 tons of structural steel required for steel flume construction by the Brownville Paper Company, Brownville, N. Y., and the leading interest has under consideration a contract for 8000 tons for export, which it is expected will be closed this week. The Charles F. Ernst Sons Iron Works was low bidder for the 500 tons for the McArthur Building, Buffalo, and bids will be closed this week for the Granger & Co. warehouse, 800 tons, and for the addition to the Buffalo Realty Company's building, 450 tons.

Old Material.—The market is quiet, almost to the point of dullness, as many mills are practically out of the market until after the inventory season. Buying is confined principally to dealers' purchases for stock and for placements on contracts. Prices are well sustained, however, and there has been but little variation from last week's quotations. Following are dealers' asking prices per gross ton, f.o.b. Buffalo:

Heavy melting steel scrap.....	\$15.00 to \$15.50
Low phosphorus steel scrap.....	18.75 to 19.25
No. 1 railroad wrought.....	16.00 to 16.50
No. 1 railroad and machinery cast scrap.	15.00 to 15.50
Old steel axes.....	19.00 to 19.50
Old iron axes.....	20.75 to 21.25
Old car wheels.....	15.00 to 15.50
Railroad malleable.....	14.50 to 15.00
Boiler plate.....	13.00 to 13.50
Locomotive grate bars.....	12.00 to 12.50
Pipe.....	12.00 to 12.50
Wrought iron and soft steel turnings..	9.00 to 9.50
Clean cast iron borings.....	7.50 to 8.00
No. 1 busheling scrap.....	13.00 to 13.50
No. 2 busheling scrap.....	11.00 to 11.50

Cleveland.

CLEVELAND, OHIO, June 29, 1909.

Iron Ore.—Shipments have increased heavily and it is estimated that the June movement will exceed 5,000,000 tons, which will make it about 2,000,000 tons more than May. It seems to be the policy of the large consumers that own their own ore properties or have long time contracts to hurry shipments so as to get down as much ore as possible early in the season. Ore cargoes are now being provided for about all the boats in commission, but there is a scarcity of up-bound coal cargoes. Nearly all the ore coming to Lake Erie ports is being sent forward to the furnace yards. Although some sales of small lots are still being made, the ore market is generally quiet. The majority of furnace interests that have bought ore have purchased their entire requirements for the year, but many that will not need ore for some time are holding off altogether. Prices, which are being firmly maintained, are as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; Old Range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—A round tonnage of Bessemer iron has been booked by M. A. Hanna & Co., who will place their Claire Furnace, at Sharpsville, Pa., in blast at once, to make Bessemer. This stack has been idle since November, 1907. They will also place their furnace B, in Buffalo, in blast on foundry iron in a few days. Then all of their three Buffalo furnaces will be in operation. Prices on Bessemer iron have stiffened and one furnace interest has rejected an offer of \$15.25, Valley furnace, for a 10,000-ton lot. The foundry iron market is quiet, the only sales reported being a few small lots. Local furnaces will start the second half in good shape, having only a small tonnage of second quarter iron on their books, on which shipments have been held up, and being well sold up for the third quarter. Prices on foundry iron are slightly firmer. In the Valley No. 2 foundry is firm, at \$15.25, and local furnaces are holding to \$15.25 to \$15.50, at furnace, for outside shipment. Local interests report a fair demand for foundry iron in other districts, particularly the East, some tonnage being placed by some

of the large consumers. We quote, delivered, Cleveland, for the last half, as follows:

Bessemer	\$16.15 to \$16.40
Northern foundry, No. 1	15.75 to 16.25
Northern foundry, No. 2	15.25 to 15.75
Northern foundry, No. 3	14.75 to 15.25
Southern foundry, No. 2	15.85 to 16.10
Gray forge	14.50 to 14.75
Jackson County silvery, 8 per cent, silicon	20.05

Coke.—Inquiries are out for the requirements of one furnace for the last half. Prices on furnace coke are firmer. We quote standard Connellsville furnace coke at \$1.60 to \$1.65 per net ton, at oven, for spot shipment, and \$1.75 to \$1.80 for the last half. Some contracts for foundry coke are being placed. We quote standard makes of 72-hr. foundry coke at \$1.80 to \$2.10 for spot shipment and \$2.10 to \$2.25 on contract.

Finished Iron and Steel.—Specifications on contracts continue heavy, only one mill agency reporting any falling off. Some of the mills had low priced steel bar tonnage on their books, for which specifications were to be received before July 1, and these contracts have doubtless helped to stimulate recent business, so that a slight let up in July will not be surprising. Not much new business is coming out yet at present prices, but more inquiries are developing. Some of the mills are keeping about even on deliveries, and others are getting a little further behind. The best delivery now promised on steel bars is from five to six weeks. Although the leading interest is still quoting steel bars at 1.20c., Pittsburgh, independent producers report the closing of some contracts on the 1.25c. basis. Plates and structural material are firm at 1.30c., Pittsburgh, and it intimated that the leading interest will advance its price on July 1 to 1.35c. A structural shop has closed a contract with an independent interest for 1000 tons of plates and shapes at the 1.35c. price. The American Shipbuilding Company has closed a contract with the Carnegie Steel Company for 9500 tons of plates and shapes required for the two new lake boats ordered by the Pittsburgh Steamship Company. Specifications on this contract are already being furnished. Some additional tonnage for boat construction may develop soon. The Supreme Court of Ohio has decided that the Cuyahoga County commissioners acted illegally in awarding the contract for the Dennison-Harvard bridge, Cleveland, 6300 tons, to the King Bridge Company of Cleveland, and the contract will now go to the McClintic-Marshall Construction Company, whose bid was slightly lower. The latter company in its bid asked for 70 days longer in which to complete the work, and the commissioners claimed that the additional cost of inspection would more than offset the lower price. Labor organizations were a factor in the original award, bringing strong pressure to secure the contract for the King Company. The demand for structural material continues good, a large amount of small work still coming up. Some shops, however, are still taking fabricated work at low prices. As a result of the settlement of the wage scale with the Western Bar Iron Association, the local bar iron mills will not remain shut down as long as intended. The Union and Empire mills will shut down July 3, and one will probably start up in two weeks and the other in four weeks. Bar iron is firmer, and local mills have advanced their price \$2 a ton to 1.45c., Cleveland. The demand for railroad spikes show an improvement, and prices are firmer. We quote standard sizes at \$1.60. The Lake Shore Railroad has placed an additional order for 1000 kegs. The demand for forging billets shows an improvement, a number of orders being placed for one to two car lots at \$30, Cleveland, for prompt shipment. Jobbers report an improvement in both mill and warehouse business, and their June business will far exceed that of any of the few preceding months.

Old Material.—The market continues fairly firm in spite of the dullness which has prevailed for the past two or three weeks. Price quotations remain about stationary, although dealers might have to make concessions if they had scrap they were anxious to move. Local dealers are doing some business in other districts, but there is practically no local demand. One steel mill is taking scrap on contracts, but no new sales are being made here. Good prices were brought for the scrap sold by the Lake Shore Railroad last week. Its heavy melting steel went at about \$16; No. 1 railroad wrought at \$15.15, and pipes at \$13. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	\$15.00 to \$15.50
Old iron rails	16.50 to 17.00
Steel car axles	19.00 to 19.50
Old car wheels	15.00 to 15.50
Heavy melting steel	14.00 to 14.50
Relaying rails, 50 lb. and over	21.50 to 22.50
Agricultural malleable	12.50 to 13.00
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	\$17.50 to \$18.00
Cast borings	6.50 to 7.00
Iron and steel turnings and drillings	8.50 to 9.00
Steel axle turnings	10.00 to 10.50
No. 1 busheling	12.00 to 12.50
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Bundled tin scrap	10.00 to 10.50

Pittsburgh.

PARK BUILDING, June 30, 1909.—(By Telegraph.)

Pig Iron.—The event of the week is the sale of 25,000 tons of standard Bessemer pig iron, made by the Bessemer Pig Iron Association, through Joseph G. Butler, Jr., to the Jones & Laughlin Steel Company for third quarter delivery, on the basis of \$15.25 at Valley furnace, or \$16.15 delivered. This iron will be used in the Bessemer works of the Jones & Laughlin Company on the South Side, Pittsburgh, and is the largest sale of Bessemer iron made in this district for many months. Some time ago the Republic Iron & Steel Company bought 10,000 tons and later 4000 tons, but will hardly be a buyer of iron again in the near future, as it is running its six blast furnaces in the Mahoning and Shenango valleys and is now making all the pig iron it will need in its Bessemer plant. There is a fair amount of inquiry for basic and foundry iron and the whole market is very strong. Higher prices on all grades in the near future are predicted. We quote Bessemer iron at \$15.25, basic \$15, No. 2 foundry \$15, malleable Bessemer \$15.25 and gray forge at \$14 to \$14.15, all at Valley furnace, the freight rate to the Pittsburgh District being 90c. a ton. We note a sale of 400 tons of basic iron at \$15, and 300 tons of Bessemer at \$15.25, Valley furnace.

Steel.—There is a growing scarcity in the supply of both Bessemer and open hearth billets, and the whole steel market is strong. Specifications against contracts for billets and sheet and tin bars are pouring into the mills, the American Sheet & Tin Plate Company having specified in June for nearly 110,000 tons of sheet and tin bars. Minimum prices on Bessemer and open hearth billets are \$23 and sheet and tin bars \$25, Pittsburgh, but one leading interest is holding open hearth billets at \$24. The Carnegie Steel Company is now quoting forging billets at \$27, minimum, Pittsburgh.

(By Mail.)

Actual orders entered in June for shipment by the mills on practically all kinds of iron and steel products show a very heavy increase over May, which month had shown a large increase over April. In May the billet and rail sales department of the Carnegie Steel Company entered actual orders and received specifications against contracts for about 215,000 tons of billets, rails and track materials, while up to June 29 about 230,000 tons were entered, but this will be increased to probably 250,000 tons when June expires. Actual orders entered by the Republic Iron & Steel Company, Jones & Laughlin Steel Company and other large steel interests in June also show a heavy increase over May. The question of making deliveries satisfactory to customers is now becoming a serious one with three or four of the leading interests. The output of pig iron, steel and finished material is steadily increasing, and it is not believed will show much falling off in July. While a number of manufacturing plants will close July 1 for 10 days or two weeks for repairs and inventory, the shutdown will be as brief as possible, as demands on the mills for shipments are urgent. Prices on all lines are very strong and an advance over to-day's prices early in July on structural steel, plates and bars is anticipated. The absolute minimum on steel bars to-day is 1.25c. and on structural and plates 1.30c., and a good deal of business is being entered at these prices. A great deal of work is in sight. General conditions in the steel trade are now very satisfactory and show a remarkable change over the situation that existed in the first two months of this year. The Carnegie Company has started up the last of its six blast furnaces at the Ohio Works at Youngstown, and seven more open hearth furnaces will be started as soon as they are ready, making 12 in operation at this plant. It is the intention of the company to roll open hearth rails at the Ohio Works. Labor conditions are slowly clearing up, the Western Bar Iron Association having come to a settlement with the Amalgamated Association on the boiling and finishing mills, practically the same scales having been adopted for the year beginning July 1 as were in force in the scale year which expired on June 30. The Republic Iron & Steel Company has not yet come to a settlement with the association, having asked that its Brown-Bonnell and Moline mills be run on the open shop basis in the future. It is not improbable, however, that the Republic Company and the Amalgamated Association will come to an agreement on the scale within a short time. On Tuesday afternoon a conference began between the independent sheet and tin mills and the Amalgamated Association, but no settlement has been reached. It is not improbable that these mills will await the outcome of the contention with the American Sheet & Tin Plate Company before signing the sheet and tin plate scales for the current scale year.

Ferromanganese.—The demand is more active than for some time, but while prices are fairly strong, they do not seem to be as firm as they were a week or two ago. We quote 80 per cent. foreign for July and August shipment at \$41, and for balance of the year at \$42, seaboard, the freight rate to Pittsburgh being \$1.95 a ton. Some fairly large lots of foreign have been sold in the past week, including 600

tons at \$42 for balance of the year, 125 tons for July and August at \$41 and 400 tons for delivery up to July 1 of next year at \$43, Baltimore. Several other fairly large sales by leading consumers are reported.

Ferrosilicon.—Indications now are that the duty on 50 per cent. ferrosilicon under the new tariff bill will be 25 per cent. ad valorem, the present duty being \$4 a ton. Prices are firm and we quote 50 per cent. at \$59 to \$60, c.i.f. Pittsburgh, which is equal to \$63 to \$64, Pittsburgh, under the present tariff. All ferrosilicon is now being sold c.i.f. on account of the buyer, owing to the uncertainty as to the new tariff. A sale is reported of 175 tons of 50 per cent. for July and August delivery at \$63, delivered Pittsburgh.

Rods.—The demand is only fairly active, most consumers being covered by contracts against which they are specifying freely. A sale of 250 tons of open hearth rods is reported at \$29, Pittsburgh. We quote Bessemer, open hearth and chain rods at \$29, Pittsburgh.

Muck Bar.—The bar iron mills are running to larger capacity than for some months, naturally increasing the consumption of muck bar, and there is some new inquiry. A sale of 500 tons of high grade is reported at \$27, Pittsburgh, and we quote the market at that price.

Skelp.—The demand for grooved and sheared plates is heavy at present, one local mill being practically filled for the next 60 days. Prices are firm, and we quote: Grooved steel skelp at 1.30c. to 1.35c.; shared, 1.40c. to 1.45c.; grooved iron, 1.50c. to 1.55c., and sheared iron skelp, 1.55c. to 1.60c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—The Carnegie Company received some specifications for standard sections against contracts and entered two or three new orders for less than 1000 tons each. This company sold and received specifications last week for 2400 tons of light rails and reports inquiries quite active. The Ohio Works at Youngstown is to be put on open hearth rails for the first time in its history, in order to take care of some open hearth tonnage taken recently by the Carnegie Company. We quote standard sections at \$28, at mill, and light rails are as follows: 12-lb., \$28; 16, 20 and 25 lb., \$27; 30 and 35 lb., \$26.75; 40 and 45 lb., \$26, all in 250-ton lots, f.o.b. Pittsburgh. Over 250 tons and up to 500 tons, 60c. a ton less, and over 500 tons \$1 a ton less. Splice bars are 1.50c. at mill.

Plates.—The two ore boats ordered last week by the Pittsburgh Steamship Company from the American Shipbuilding Company will take about 9000 tons of plates and shapes, which will be furnished by the Carnegie Steel Company. The order for three boats placed by the Government with the William Cramp & Sons Ship & Engine Building Company, Philadelphia, will require only a moderate tonnage of plates and shapes, which will also be furnished by the Carnegie Company. It is officially confirmed that the Erie Railroad is in the market for 10,000 freight cars for delivery over the last half of the year, and the order is likely to be divided between three or four of the leading car interests. The Buffalo, Rochester & Pittsburgh is also in the market for 500 freight cars, and this order will be placed in a week or two. The general demand for plates is showing steady betterment. Several large projects are under way, which will require a heavy tonnage. The market is hardening, and we now quote $\frac{1}{4}$ in. and heavier plates at 1.30c. for desirable tonnage and 1.35c., Pittsburgh, for small orders.

Structural Material.—The McClintic-Marshall Construction Company has taken a bridge over the Illinois River at Peoria, Ill., for the Peoria & Pekin Union Railway, about 2250 tons, which will have 18 plate girder spans, each 97 ft. long, and one bascule span; also a finishing shop for the American Car & Foundry Company, 400 tons, and two viaducts for the Chicago, Milwaukee & St. Paul, 750 tons. The American Bridge Company has taken some fairly large contracts, including one of about 1200 tons for a theater at Omaha, and is bidding on the Maumee River bridge at Toledo, about 3700 tons, bids for which are to be opened on July 1. The market on plain material is steadily hardening and we now quote beams and channels up to 15 in. at 1.30c. at mill and 1.35c. on small orders.

Bars.—Prices on steel bars are steadily hardening, and Carnegie, Republic, Jones & Laughlin, Cambria and Lackawanna are all quoting on the basis of 1.25c., Pittsburgh, for desirable orders, and 1.30c. for small orders. One of these is much behind in its deliveries on steel bars and is reported to have recently bought 10,000 tons from another company to help out on its contracts. The Republic has sold in the past week 3000 tons or more of steel bars at 1.30c., and the Carnegie Company has sold a large tonnage, made up of miscellaneous orders, at the same price. Specifications against contracts for steel bars are coming in very freely, and several leading makers are six weeks or longer behind in deliveries. The demand for iron bars is steadily expanding, and the Republic Iron & Steel Company and other leading makers are operating to practically full capacity. Common iron bars are firm at 1.45c., Pittsburgh, but there are only

two concerns in this district making common iron bars, these being the Lockhart Iron & Steel Company and Pittsburgh Forge & Iron Company. These two concerns also make high grade iron bars, which command much higher prices.

Tin Plate.—This week the American Sheet & Tin Plate Company will start up its Monongahela Works on the South Side, which contain eight hot mills, and next week will start up its United States Works at Demmler, Pa., which contain eight tin mills and three sheet mills. Both these plants will be operated nonunion. The demand for tin plate continues active, and shipments by the mills in June showed a heavy increase over May. Consumers are urging prompt shipments in the fear of a shutdown of some of the tin plate mills on account of labor troubles. Prices are firm, and we quote 100-lb. cokes at \$3.40 per base box, f.o.b. Pittsburgh.

Sheets.—The demand for black and galvanized sheets and also for roofing material is heavier than for some time, partly due to the increase in building operations and also because of the fear by consumers that some of the sheet mills may close on July 1 on account of labor troubles. While the tone of the market is stronger, some shading is still being done on the lighter gauges of black and galvanized sheets and also on roofing sheets. We quote one-pass box annealed black sheets, No. 28 gauge, at 2.20c., and No. 28, galvanized, at 3.25c., but these prices are being shaded on good orders. The regular price of painted roofing sheets, No. 28, is 1.55c. per square and of galvanized No. 28, is 2.80c. per square for $2\frac{1}{2}$ -in. corrugations, but these prices are also being shaded.

Hoops and Bands.—New orders are more plentiful than for some time and prices are firmer. We quote steel hoops at 1.50c. and bands at 1.15c., steel card extras on the latter, but these prices are being shaded for desirable orders.

Spelter.—The demand is heavier than for some time and the market is now very strong, with every indication of going higher. A local consumer bought June 25 125 tons of spelter at 5.35c., East St. Louis, equal to 5.47 $\frac{1}{2}$ c., Pittsburgh, and we quote the market at that price. We are advised that some sellers are asking 5.40c. and as high as 5.50c., East St. Louis.

Spikes.—The Vanderbilt lines, the Norfolk & Western and three or four other roads have been fairly large buyers of spikes recently, their orders being pretty well distributed among three or four of the leading makers. Prices on railroad spikes are firmer, some low quotations having recently been withdrawn. We quote railroad spikes at \$1.65 to \$1.70 for 5 $\frac{1}{2}$ x 9-16 in., and \$1.75 to \$1.80, base, for the smaller sizes, in carloads and larger lots, 5c. per keg additional being charged for less than carloads.

Merchant Pipe.—The Union Oil Company of California is reported to have placed upward of 300 miles of 8-in. line pipe for an oil line in California, the business having been divided between two Western mills. The Pittsburgh Valve, Foundry & Construction Company is the lowest bidder on a high pressure fire service line at San Francisco, and will likely get the order, which will require about 20 miles of pipe. The demand is steadily increasing, and new orders and specifications against contracts received by the leading pipe mills in June show a large increase over May; this is also true of shipments. Official discounts are being firmly held, these being \$1 and 5 on black steel pipe, $\frac{3}{4}$ to 6 in., and 78 and 5 on black iron pipe, $\frac{3}{4}$ to 6 in., in carloads, and larger lots to the largest trade.

Boiler Tubes.—The demand is slowly increasing, but is still far short of normal. Regular discounts on tubes continue to be more or less shaded, depending on the order.

Iron and Steel Scrap.—A new consumer of scrap has come in the market, this being the West Penn Steel Company, now building sheet mills at Brackenridge, Pa., which has bought recently 3000 to 4000 tons of various grades of scrap for delivery late in the year. Consumption is heavier at the present time than at any period in the last two years. Prices are firm and give indications of being higher. Dealers now quote heavy steel scrap for delivery at Follansbee, Sharon, Leechburg, Monessen, Steubenville and Pittsburgh at \$16 to \$16.25 per gross ton delivered. Dealers quote cast iron borings at \$10, bundled sheet scrap \$14 to \$14.50 at consuming point, No. 1 cast scrap for foundry use at \$15 to \$15.25, No. 2 \$14.50, sheet bar crop ends \$17.50, No. 1 railroad malleable \$14.75 to \$15, grate bars \$13, No. 1 busheling \$14 to \$14.25, No. 2 \$12 to \$12.25, low phosphorus melting stock 0.04 and under \$18.75 to \$19, rerolling rails \$16.50, old car wheels \$16.25 to \$16.50. Locomotive axles are held at \$25 to \$26 and locomotive tires at \$18 minimum. Machine shop turnings are \$12 to \$12.25, rerolling rails \$18 to \$18.25, iron axles about \$24, steel axles \$19.50 to \$20 and stove plate \$11.75 to \$12. All above prices are per gross ton, f.o.b. cars, Pittsburgh, unless otherwise stated.

Coke.—Skepticism as to the ultimate success of the project to consolidate a large number of the leading coke plants in the Connellsville and other regions is increasing. Those in charge of the project promise an official statement about July 15, in which will be set forth the coke properties to be taken over and the identity of those who are financing the

merger. The output of coke in the two Connellsville regions has finally passed the 300,000-ton mark, the output of the Upper and Lower Connellsville regions last week having been 332,557 tons, an increase over the previous week of 22,500 tons. There are 37,820 ovens in the Upper and Lower Connellsville regions, and of these 27,805 were active last week, or 73.5 per cent. of the whole number. Prices of coke do not show much betterment, the best grades of furnace coke being held at \$1.60 per net ton, at oven, for prompt shipment, and about \$1.70 for delivery over last half of the year. Standard makes of 72-hr. foundry coke are held at \$1.80 to \$1.90 per net ton, at oven, for prompt shipment, while \$2.10 and up to \$2.50 is being quoted on contracts for delivery over last half of the year.

San Francisco.

SAN FRANCISCO, June 23, 1909.

Orders for finished materials are now coming forward more rapidly. While the tonnage booked for immediate use has not increased materially, there is a strong tendency among the Pacific Coast merchants to increase their holdings in all lines. The increasing firmness in some departments is partly responsible for this attitude, but many jobbers are beginning to take a more liberal view as to the probable requirements of the market for the remainder of the year. Jobbing prices on rolled products in general are unsatisfactory, the figures given by different houses showing a wide variation, and merchant pipe is especially low. There is considerable cutting in iron bars, though steel bars show more firmness than for some time. Liberal inquiries for bars are still coming up and from all indications the tonnage required for the next few months will be large. There is less inquiry for cast iron pipe than for some time, but deliveries on contracts are now coming forward in good shape. Activity in the machinery market is gradually increasing. The mining interests are coming out for considerable supplies and there is a steady movement of pumping machinery and oil well equipment.

Rails.—Standard rails remain comparatively quiet. Inquiries for light rails have been gradually increasing and orders have been taken for a considerable tonnage in the last few weeks. The mining interests, which have been out of the market almost entirely since last fall, are now purchasing freely and the movement is much larger than at this time last year.

Structural Material.—Few new contracts have come out recently and the City and County Hospital job has again been held up. New bids have also been called for the Hall of Justice, but it is understood that the steel contract will remain with Dyer Bros., who are now ready to proceed with the work. The Anglo & London-Paris National Bank, requiring only a moderate tonnage, has awarded its contract to the Pacific Rolling Mill Company. The Harbor Commissioners have awarded contracts for two more sections of sea wall, one of which will require 190 tons of structural steel, to be furnished by the McClintic-Marshall Construction Company. In addition to the structural shapes, this sea wall work is taking a large tonnage of bars as reinforcement. The city of Los Angeles has ordered a lot of steel tunnel forms. New structural projects are coming out slowly and several of the more important ones announced before are still held back. Among the local buildings to be erected in the near future are a five story Class A structure on upper Market street, and a theater and store building on Market street near Sixth, to be erected for Rudolph Spreckels, at a cost of \$250,000. The Order of Eagles is planning to erect a \$175,000 Class A building in this city. The Co-Tenant Company of Los Angeles will begin work on a steel frame building in September.

Pig Iron.—The award of a large fire hydrant contract to a local manufacturer is expected to give a slight impetus to the market, and conditions are gradually becoming more favorable for the foundry trade. A fair tonnage is still required for structural work, and the manufacturers of hydraulic machinery, &c., are more active than for many months. Individual orders are still small, but the movement is gradually becoming more general, and there is now some prospect that normal conditions may prevail before the end of the year. There have been no arrivals of any consequence recently, but the supply is still much greater than the needs of the market, and prices are weak. English and Chinese irons are offered at \$22.50, or, in some cases lower, and Continental iron is quoted at \$21.50. Very little domestic pig iron is moving in this market.

Cast Iron Pipe.—No large pipe contracts have been placed recently, and the total tonnage is lighter than for some time past, though a number of small orders have been received from water and gas companies. Nothing has come of the Imperial project, for which wrought pipe will be used. The city of San Bernardino has come into the market for 260 tons of pipe. The town of Independence, Cal., is planning to lay a new system of 8-in. mains. The city of Long Beach, Cal., is making estimates for a high pressure system

for fire protection. The first lot of pipe for the new San Francisco system has arrived, and the city has completed preparations to handle the material. The city has awarded the contract for 1200 hydrants to be used in this system to the Union Iron Works for \$134,388. The lowest bid on the 2700 gate valves was submitted by the Pittsburgh Valve, Foundry & Construction Company, but the award has not been announced. The city of Los Angeles is also in the market for a lot of fire hydrants. Water pipe is quoted at \$36 per net ton for 4 to 6 in. and \$35 for 8 to 12 in.

Merchant Pipe.—Aside from the continued price cutting by local merchants, which is as much in evidence as ever, the market on merchant pipe is very satisfactory. The volume of business with the jobbers shows a further increase and a heavy tonnage is now moving from the mills. Coast merchants have been carrying only sufficient stock to meet the current demands, relying on the mills for prompt shipments, but they are now beginning to accumulate a larger supply. Additional inquiries are coming in from the oil fields, where a liberal movement is already taking place, though few important contracts for these interests have been placed recently. The city of Los Angeles has ordered a small lot of 2-in. pipe. The Imperial Gas Company, which is installing an extensive distributing system at Imperial, Cal., has ordered a considerable tonnage of wrought iron pipe from the Susquehanna Iron Company.

Old Material.—Locally there is practically no market for old structural steel and rail scrap, though occasional sales are made around \$8.50 or \$9. There is still a large accumulation on hand, but the stock is being gradually diminished by shipments to the East Coast. A cargo of about 4000 tons was shipped this week, and about 3000 tons of miscellaneous scrap has been shipped to Italy. A fair movement of cast iron scrap has been going on for several months, reducing the stock to small proportions. Heavy cast scrap is firm at \$18 and light scrap is offered at about \$17.

Louis H. Abenheimer, for 10 years associated with the Arthur Koppel Company, has opened offices for himself at room 321, Monadnock Building, San Francisco.

It is reported in Los Angeles that a large Ohio concern is planning to start a plant in that city or San Diego for the manufacture of oil well tools.

The city trustees of Sacramento, Cal., have passed an ordinance limiting the area in which foundries may be established. The purpose was to prevent the Peerless Iron Works from establishing a foundry at Third and N streets, where a building was being prepared for it.

Assistant General Manager Duncan, of the National Tube Company, is visiting the San Francisco office.

The Main Street Iron Works of this city has taken a contract for repairs to the United States Army transport Thomas.

The New Jersey Steel & Iron Works is negotiating for a large factory site on the estuary in Alameda.

Owing to the large amount of repair work now being done on the United States cruisers and the battleship Oregon, a scarcity of laborers is reported at the Puget Sound Navy Yard. The yard is now employing about 1300 men.

Bates & Chesebrough, operating a line of sailing vessels around Cape Horn, announce that they expect to carry a heavy tonnage of hardware and steel products to the Pacific coast.

New York.

NEW YORK, June 30, 1909.

Pig Iron.—There is a fair amount of activity. Buyers having purchased very conservatively so far this year, on the basis of their requirements in sight, are re-entering the market as their own increasing business calls for more raw material. The majority of the Lehigh and Schuylkill makers have been asking higher prices for foundry iron and Buffalo furnaces who picked up quite a lot of business lately along the Sound, on the basis of \$14.50 for No. 2 Buffalo, have advanced. Among the sales in the Buffalo District recently were two lots of 10,000 tons each. Pipe makers are in the market to cover contracts closed lately for pipe, among which are 14,000 tons for the high pressure service in this city, which went to a Delaware River shop. Further inquiries are in the market from Eastern steel makers, aggregating about 20,000 tons of basic pig. A part of this tonnage is for fairly prompt delivery and a part for deferred delivery. We quote \$17 to \$17.25 for No. 1 Northern foundry, \$16.50 to \$16.75 for No. 2 foundry, and \$15.75 to \$16 for No. 2 plain. Alabama iron is quoted at \$16.25 to \$16.50 for No. 1 foundry and \$15.75 to \$16 for No. 2 foundry.

Ferroalloys.—The sale of about 5000 tons of ferromanganese to a Pittsburgh buyer is reported, and there are inquiries in the market for more than 4000 tons at present. A number of sales of good round lots have been made and the market here is firm at \$42. Ferrosilicon is still scarce and sellers are asking from \$62 to \$62.50. Some good inquiries are out for the first half of next year and while quo-

tations have been reported as low as \$63 there is a general feeling that \$63.50 to \$64 for the first half of next year is the ruling price. One or two inquiries for the last half of next year are mentioned, but sellers do not seem to care to quote for delivery that far ahead.

Structural Material.—Among the contracts finally closed during the week are 9000 tons for the Post Office at the Pennsylvania terminal to the Pennsylvania Steel Company, 3000 tons for the Hunnewell street viaduct on the Long Island Railroad, 3000 tons for the Willamette River bridge, 4000 tons for the Hewitt-Bryce Building, 1400 tons for additional Reading works, 500 tons for a planing mill in West Virginia and additional work for the Northwestern, St. Paul and Rock Island lines. Inquiries for structural material keep up very well for the season. During the past week the leading interest has in hand 150 propositions, all desirable from the point of view of the fabricator, and none of them above 3000 tons, which represent a round tonnage. Bids now outstanding which foot up to 45,000 tons should be settled within a few weeks. During July the records of the American Bridge Company show sales of 45,000 tons, and business was not secured in the case of jobs bid on, which aggregated between 70,000 and 75,000 tons. This, of course, does not include all the work actually placed, because no bids are put in in the case of many jobs which may not be desirable for one reason or the other. It is expected that July will prove a heavy month, if it does not, indeed, reach the May record of 200,000 tons. Among the local jobs about to be closed are the Heidelberg Building, 1600 tons; the Tilden, 800 tons, and the first batch of the Bronx plant of the American Bank Note Company, 3500 tons, out of total requirements of about 6000 tons. While competition in fabricated work is still keen, and prices close, they are better than they have been and are tending upward. We quote beams and channels up to 15 in. at 1.41c. to 1.46c., tidewater, on shipments from mill.

Steel Rails.—It has not yet been decided whether any part or the whole of the 50,000 ton Argentine order will be rolled at Ensley, Ala. The Eastern rail market is quiet. It is expected, however, that more orders will come out after the first of July, since it means the beginning of a new fiscal year with many railroads, who have been trying to make as good a showing as possible during the last year and have, therefore, withheld purchases. The New Haven order for 9000 tons has not yet been placed. The Pennsylvania Steel Company has taken 2000 tons from a New England trolley line.

Bars.—With considerable business offering for future delivery nearly all the Eastern manufacturers of bar iron have withdrawn quotations on anything beyond actual specifications and orders for early delivery. It is now difficult to find any manufacturer quoting under 1.45c., tidewater, and quite a number of mills are refusing to take business at this price. The situation appears to have materially improved, partly as the result of better business and partly as a consequence of the strength of raw material. Steel bars are firm at 1.41c., tidewater, with deliveries steadily falling further behind.

Wrought Iron Pipe.—The Reading Iron Company, Susquehanna Iron Company, Cohoes Rolling Mill Company, Longmead Iron Company and Chester Pipe & Tube Company notified all their customers June 21 of an advance of \$2 per ton on wrought iron pipe, to take effect on that date. A further advance of possibly as much as \$4 per ton is confidently expected early in August. A number of these manufacturers are not taking any time contracts, but are only selling on specifications for immediate shipment. It is understood that the mills of the Reading Iron Company and Susquehanna Iron Company are running full time, double turn, and have specifications in hand which will easily carry them to August 1.

Cast Iron Pipe.—The contractor for the installation of the extension of the high pressure service in New York City has purchased the cast iron pipe and special castings necessary for the prosecution of this work. The contract for the pipe, covering 14,000 tons of extra thick, was secured by R. D. Wood & Co., who also were awarded a contract for about half the specials, amounting to 1000 tons. M. J. Drummond & Co. secured the remainder of the specials, comprising the valves. The steel castings went to the Chester Steel Castings Company. It is believed that the contractor paid something over \$24 for the pipe, which indicates the strength of the market. The city of Washington, D. C., last week bought 4000 tons of cast iron pipe from the Glamorgan Pipe & Foundry Company, comprising 4 to 24 in. The general demand for pipe is rather quiet. Carload lots of 6-in. are quoted at \$23.50 per net ton tidewater.

Old Material.—The market at present is somewhat quiet, but with little disposition by dealers to sell at present prices. They evidently feel quite confident that the excellent conditions now prevailing in general business and the fine prospects for crops will bring about a much stronger demand after the passage of midsummer with its general relaxation from business cares. That the situation is not

seriously discouraging is shown by the offers of numerous consumers to buy at prices slightly under those now ruling. The past week was not without some developments worthy of notice. Several transactions occurred in steel scrap, comprising probably a total of about 15,000 tons, on which \$15.50 to \$16, eastern Pennsylvania, was realized. Offers under this price are now being made, and some dealers believe that a recession may be forced before any considerable buying of this class of material again occurs. It is, therefore, not surprising that some difference of opinion is found regarding actual values at this time. Rolling mills are apparently fairly well stocked, and the demand for wrought scrap and busheling scrap is less active, while the mills are again becoming critical as to the character of material received, which always indicates abundant supplies in sight. The foundries are buying somewhat more freely, and a fair tonnage of cast scrap has therefore recently been moving. Both heavy cast and stove plate are now in good demand. Quotations are, as follows, per gross ton, for delivery in New York and vicinity:

Old girder and T-rails for melting.....	\$12.00 to \$12.50
Heavy melting steel scrap.....	12.00 to 12.50
Relaying rails.....	20.00 to 20.50
Standard hammered iron car axles.....	19.00 to 19.50
Old steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	14.50 to 15.00
Iron track scrap.....	13.00 to 13.50
No. 1 yard wrought, long.....	13.50 to 14.00
No. 1 yard wrought, short.....	12.50 to 13.00
Light iron.....	8.00 to 8.50
Cast borings.....	8.25 to 8.75
Wrought turnings.....	9.50 to 10.00
Wrought pipe.....	12.00 to 12.50
Old car wheels.....	14.50 to 15.00
No. 1 heavy cast, broken up.....	13.00 to 13.50
Stove plate.....	11.50 to 12.00
Locomotive grate bars.....	10.50 to 11.00
Malleable cast.....	14.00 to 14.50

Metal Market.

NEW YORK, June 30, 1909.

Copper.—While the Metal Exchange made some slight changes in quotations on copper during the week, there was practically no trading, and it would be hard to predict just what price a large amount of either lake or electrolytic could be bought at in this market at the present time. Some small lots of electrolytic have been offered during the week at less than 13c., and to-day several would-be sellers quoted 13c. as their price, but there were no takers. The London market situation is having its effect here, influencing possible buyers who are holding off with the idea that the price may go lower here. The fact that the production has been very large is also influencing them, but the shipments abroad during the month have been of such record breaking proportions that the demand is gradually gaining on the production. As stated above, small lots of electrolytic copper might be had at 13c., but we would quote the market at 13.12½c. for electrolytic and 13.37½c. for lake, as the market is somewhat stronger than it was at this time last week. The exports this month have amounted to 33,399 tons, and it is freely predicted that the exports for June will be about 35,000. To-day in London spot was quoted at £59 and futures at £59 17s. 6d., a higher price than was established this day last week.

Pig Tin.—There is no demand for pig tin worth mentioning, and the only trading of any account done during the week was on June 24, when about 250 tons of metal was sold. The buying was mostly in car lots, and it gave the market some activity and established the high price of the week, which was 29.30c. That price is but little above import cost, and during the day pig tin was sold anywhere from 29.15c. to the price established at the close, so it can be seen that even on the one active day of the week tin was sold at about the import cost and on the other days, as prices established show, sellers who disposed of any metal at all did so for the sake of keeping busy or stimulating business rather than for profit. Prices were:

	Cents.
June 23.....	29.15
June 24.....	29.20
June 25.....	29.30
June 28.....	29.25
June 29.....	29.20
June 30.....	29.15

The London market was also inactive. Export tin was sold to-day at £131 17s. 6d. and futures were £133 12s. 6d., which is lower than the price of last week. The arrivals of tin were 3470 tons, and there are 1925 tons afloat.

Lead.—Some resale lots of lead have been offered by outsiders during the week at 4.35c., and it is more freely quoted at that price than last week, but most of those holding large lots demand 4.40c. The American Smelting & Refining Company quotes 4.35c., New York, and the St. Louis market is quoted at 4.30c. to 4.32½c. There are reports of some shading in that territory.

Spelter.—In some quarters spelter was quoted to-day at 5.35c., and it was asserted that sharp buyers might be able to obtain it at slightly under that figure. Some sellers

declare, however, that they have refused offers of less than 5.40c., although they admit that the market is dull. We quote 5.35c. New York and 5.27½c. St. Louis.

Antimony.—With the exception of Hallett's there is plenty of antimony on hand, and there is but little buying. Prices are kept steady, however, at 7.50c. for Hallett's and the price of Cookson's is normal at 8.25c. Other brands may be easily obtained for as low as 7c.

Aluminum.—A steady demand for aluminum, due to an extent to the activity in the electrical trade, has helped maintain the price of that metal at 24c. for No. 1 pure ingots and 34c. for sheets.

Tin Plate.—There is a lull in the tin plate trade. Most of the canners have completed their buying and the demand from other sources is less than normal. The strike at some of the mills ceases to be a subject of interest in the market, as it is generally admitted that there is plenty of tin plate on hand to supply the demand. We quote for 100 I C coke plates, \$3.64.

Old Metals.—The following dealers' selling prices represent the New York market:

	Cents.
Copper, heavy and crucible.....	12.75 to 13.00
Copper, heavy and wire.....	12.50 to 12.75
Copper, light and bottoms.....	11.50 to 11.75
Brass, heavy.....	9.25 to 9.50
Brass, light.....	7.50 to 7.75
Heavy machine composition.....	11.75 to 12.00
Clean brass turnings.....	8.25 to 8.50
Composition turnings.....	9.75 to 10.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.90 to 3.95
Zinc, scrap.....	3.75 to 4.00

Iron and Industrial Stocks.

NEW YORK, June 30, 1909.

The crest of the wave of advancing prices on iron and industrial stocks apparently passed about 10 days ago, and since then the course of events in the stock market had not been productive of noteworthy features until Tuesday of this week. The general level of transactions has been considerably under the high prices recently reached, but no serious tendency to decline was shown. The fluctuations for some time were within quite narrow limits, but sharp advances have again been shown. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	15½	Pressed St., pref.....	102	103½
Allis-Chalm., pref.....	51½	Republic, com.....	30½	31½
Beth. Steel, com.....	28¾	Republic, pref.....	104	104½
Beth. Steel, pref.....	60¾	Sloss, com.....	82½	83½
Can, com.....	11¾	Sloss, pref.....	115½	115¾
Can, pref.....	80¾	Pipe, com.....	84	85
Car & Fdry, com.....	55½	Pipe, pref.....	85¾	86¾
Car & Fdry, pref.....	117	U. S. Steel, com.....	65¾	69¾
Steel Foundries.....	118	U. S. Steel, pref.....	123½	126¾
Colorado Fuel.....	42¾	Westinghouse Elec.....	84½	85½
General Electric.....	161½	Chl. Pacu. Tool.....	23	24
Gr. N. ore cert.....	75	Cambria Steel.....	40¾	41¾
Int. Harvester, com.....	85	Lake Sup. Corp.....	23	26
Int. Harv., pref.....	121½	Penna. Steel, pref.....	109	110
Locomotive, com.....	59¾	Warwick.....	8¾	9
Locomotive, pref.....	117½	Crucible St., com.....	8¾	9¼
Nat. En. & St., com.....	16	Crucible St., pref.....	70	71½
Nat. En. & St., pref.....	80	Harb.-W. Ref., com.....	20	20
Pressed St., com.....	42¾	Harb.-K. Ref., pref.....	85½	85½

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 68¾, preferred 125¾, bonds 105½; Car & Foundry common 57, preferred 117; Locomotive common 60¾, preferred 118; Steel Foundries common 49; Colorado Fuel 44½; Pressed Steel common 43¾, preferred 103¾; Railway Spring common 43¾; Republic common 31¾, preferred 104¾; Sloss-Sheffield common 83½; Cast Iron Pipe common 33¾, preferred 87½; Can common 11½, preferred 82¾.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall Street, New York, furnish the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, due January 1, 1926.....	89	90
Bethlehem Steel purchase money 6s, August, 1908.....	116¾	118¾
Buffalo Iron 5s, October, 1925.....	97	100
Buffalo & Susquehanna Iron 1st 5s, June, 1932.....	99¾	100
Buffalo & Susquehanna Iron deb. 5s, January, 1926.....	94	97
Dominion Iron & Steel 5s, July, 1929.....	90¾	91
La Belle Iron Works 1st 6s, December, 1923.....	103½	106½
Lackawanna Steel 1st 5s, April, 1923.....	97¾	97¾
Maryland Steel 1st 5s, February, 1922.....	101	101
Penn Steel 1st 5s, November, 1917.....	101	101
Pennsylvania & Maryland Steel 6s, September, 1925.....	111	111
Republic Iron & Steel 1st 5s, October, 1934.....	101	101½
Sloss Iron & Steel 1st 6s, February, 1920.....	106½	108½
Sloss Iron & Steel consol. 4½s, April, 1918.....	94½	96½
Jones & Laughlin 1st 5s, May, 1939.....	100½	100¾

United States Steel Corporation.

Collateral Trust 5s, Series A, C, E, April, 1951.....	114½	115½
Collateral Trust 5s, Series B, D, F, April, 1951.....	114½	115½
Sinking Fund 5s, April, 1963.....	105¾	105¾
Union Steel 1st 5s, December, 1952.....	105¾	105¾
Clairton Steel 5s, 1908-1913.....	100	100
St. Clair Furnace 1st 5s, 1910-1939.....	100	100
St. Clair Steel 1st 5s, 1908-1926.....	100	100
Illinois Steel Company deb. 5s, January, 1910.....	100½	100½
Illinois Steel Company 5s, April 1, 1913.....	100¾	100¾

All bonds quoted "and interest."

Dividends.—The United States Cast Iron Pipe & Foundry Company will pay July 2 the quarterly dividend of 1¾ per cent. on the preferred stock which was held up by injunction some time ago.

The American Locomotive Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable July 21.

Manning, Maxwell & Moore, Inc., New York, have declared the regular quarterly dividend of 1½ per cent., payable July 1.

The E. W. Bliss Company, Brooklyn, N. Y., has declared a quarterly dividend of 2½ per cent. on the common stock and 2 per cent. on the preferred stock, both payable July 1.

The American Shipbuilding Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable July 15.

The American Iron & Steel Mfg. Company will pay July 1 the balance of ¾ to 2 per cent. on dividends declared on both the common and preferred stock March 12, 1907, to all shareholders as of record March 23, 1907. This is the dividend held back pending the litigation recently concluded, in which the court held that the preferred and common stocks were entitled to participate equally in dividends after the preferred and common had each received 5 per cent.

The Union Switch & Signal Company, Pittsburgh, Pa., a Westinghouse interest, has declared a quarterly dividend of 2½ per cent.

The Standard Underground Cable Company has declared the regular quarterly dividend of 3 per cent., payable July 10.

The Western Bar Iron Association Signs Amalgamated Scale.

After a three days' conference between the Wage Committees of the Western Bar Iron Association and the Amalgamated Association of Iron and Steel Workers, held at Cambridge Springs, Pa., ending Saturday evening, June 26, an agreement was reached on the puddling and bar iron scales for the scale year beginning July 1, and which is practically the same scale that expired on June 30, only a few minor changes being made and several new foot notes added. The memorandum of agreement in the boiling scale is unchanged, except that a new clause is added which reads: "All tonnage men shall be paid out of the office, provided full data be furnished the company as to details."

The concerns that are members of the Western Bar Iron Association, and which will sign the Amalgamated scale as agreed upon above, are as follows: American Car & Foundry Company, Detroit, Madison, Ill., and St. Louis, Mo.; Interstate Iron & Steel Company, East Chicago, Ind.; Fort Wayne Iron & Steel Company, Fort Wayne, Ind.; Highland Iron and Steel Company, Terre Haute, Ind.; National Rolling Mill Company, Vincennes, Ind.; Lake Erie Iron Company, Empire Rolling Mill Company and Union Rolling Mill Company, Cleveland, Ohio; Ohio Falls Iron Company, New Albany, Ind.; Shenango Iron & Steel Company, Wheatland, Pa.

No Scale Agreement Yet with the Republic Company.

As yet no scale agreement has been made on the Amalgamated scales for puddling and finishing between the Amalgamated Association and the Republic Iron & Steel Company. Recently this company asked the Amalgamated Association that the Brown-Bonnell mills at Youngstown and the mills at Moline, Ill., be operated as open shop mills. Some new continuous mills have recently been added to the Brown-Bonnell plant and it now contains five continuous mills and four hand mills. Only about 80 men are employed on these four hand mills, and the plant is a steel proposition entirely, and this applies also to the Moline mills. For this reason the Republic Company asked the Amalgamated Association for the privilege of running these two mills on the open shop basis, but so far the association has refused to grant this request. It is understood the Republic Company will agree to sign the scales agreed upon with the Western Bar Iron Association if the Amalgamated Association will make the concession asked, but if it persists in its refusal to grant this request it is not improbable that the company will refuse to sign any scales. A conference will soon be held between the Republic Company and the Amalgamated Association, when an effort will be made to settle the points in dispute.

The United States Cast Iron Pipe & Foundry Company.

The annual report of the United States Cast Iron Pipe & Foundry Company for the fiscal year ending May 31, 1909, shows to a marked degree the effect of the depression in the iron and steel business during the past year. The net earnings, \$184,731, are the lowest since the company issued its first financial statement in 1902, while the net profits, \$156,948, are only equal to 1.26 per cent. on the preferred stock, and the dividend of 1¼ per cent. declared July 2, 1908, will be paid July 2, 1909, out of a fund termed "reserve for working capital," which amounts to \$2,468,750 at the present time. The year's results were as follows:

Gross income from operations for the fiscal year ended May 31, 1909.....	\$184,353.51
Other income for the year, net.....	90,377.41
Total income.....	\$274,730.92
Less interest on American Pipe & Foundry Company's bonds	90,000.00
Net earnings.....	\$184,730.92
Reserved for improvements from current year's earnings.....	\$15,782.26
Reserve to secure doubtful accounts.....	12,000.00
	27,782.26
	\$156,948.66
Add amount transferred from "reserve for additional working capital".....	\$209,896.64
Balance profit and loss, May 31, 1908....	16,024.45
	225,921.09
	\$382,869.75
Less dividend declared payable September 1, 1908, payment restrained.....	218,750.00
Balance profit and loss, May 31, 1909.....	\$164,119.75
The balance sheet as of May 31, 1909, is as follows:	
<i>Assets.</i>	
Cost of properties.....	\$24,103,380.95
Treasury stock at cost.....	347,555.00
Bonds of American Pipe & Foundry Company and sinking fund.....	611,843.67
Raw and manufactured materials, &c.....	2,736,776.10
Accounts, bills receivable, &c.....	2,639,772.98
Cash	333,806.29
Total.....	\$30,773,134.99
<i>Capital and Liabilities.</i>	
Preferred stock issued.....	\$12,500,000.00
Common stock issued.....	12,500,000.00
Bonds of American Pipe & Foundry Company	1,500,000.00
Dividend declared payable September 1, 1908, payment of which was restrained pending decision of the courts.....	218,750.00
Accounts payable.....	1,510,923.31
Total capital and liabilities.....	\$28,229,673.31
Surplus:	
Reserve for additional working capital	\$2,250,000.00
Reserve for insurance fund.....	100,000.00
Reserve to secure doubtful accounts	29,341.93
Undivided profits.....	164,119.75
	2,543,461.68
Total.....	\$30,773,134.99

President George B. Hayes makes the following accompanying statement:

On the 31st day of May of this year the company completed the first 10 years of its corporate existence. By reference to the annual statements which have been made from year to year you will observe that during this period the total net earnings have been as follows:

Total net earnings from March 31, 1899, to May 31, 1909.....	\$10,936,701.79
This amount has been disbursed as follows:	
31 dividends on the preferred stock.....	\$5,625,000.00
9 dividends on the common stock.....	1,125,000.00
Total dividends.....	\$6,750,000.00
Expenditures out of earnings for new buildings, equipments and tools.....	\$1,608,378.33
Reservation to secure doubtful accounts.....	64,203.68
Reservation for insurance fund.....	100,000.00
Reservation for additional working capital.....	2,250,000.00
Undivided profits now in profit and loss account..	164,119.75

During this 10 years the manufacturing capacity of the company has been greatly increased. The physical condition of the plants, tools and properties is better than ever before. The total loss for bad debts over the entire

period of 10 years does not exceed six-tenths of one mill on gross sales.

During the fiscal year closing May 31, 1909, business has not been good. The industrial depression which began in October, 1907, continued during the major portion of the year, and the company has suffered with others in the same general line of business. I may say, however, that all the profits shown for the year ending May 31, 1909, have been made in the last six months, and that during the past three months there has been a noticeable increase in business. We hope it will continue, and on its continuance depends the payment of dividends. That, however, the incoming board of directors will determine.

The Pennsylvania Railroad Company's Wage List.

Figures just compiled covering the operations of the various portions of the Pennsylvania Railroad system, both east and west of Pittsburgh, show that in 1908 these lines paid out in wages a total of \$125,543,947. This represented a reduction of \$29,471,951 in wages, as compared with the \$155,015,898 expended in 1907. In the latter year the companies employed an average of 199,000 men, while in 1908 the number was 175,000—a reduction of 24,000 men.

Though there was such a large decrease in the total sum paid for wages the rate of wages as established for 1907, which represented an increase of 10 per cent. over the rate paid during the greater part of 1906, was maintained for all classes of employees without abatement through 1908. This increase in the rate paid, together with minor readjustments of wages, amounted to some \$15,000,000 annually. There were, by reason of the lack of business, some reductions in hours in 1908 which affected the gross sums earned by certain classes of employees, but no changes were made in rates of pay.

In 1907 the gross earnings from operation of the companies included in this compilation were \$321,478,308, and in 1908 they were \$267,559,213—a loss of \$53,919,095. It will appear, therefore, that in 1907 the company paid for labor a sum equivalent to 48 per cent. of its total earnings from operation, and in 1908 wages absorbed a sum equal to 46 per cent. of the total. Of course, not all payments to labor were chargeable against the gross earnings, but it was nevertheless these earnings which directly or indirectly made possible such large payments to labor, and which rendered necessary the radical reductions in such payments when business fell off.

The fact that the necessity on the part of a railroad company to keep most of its plant going even in times of severe business depression makes impossible an adjustment of its expenditures to its earnings, such as a manufacturer may bring about, is made clear by comparing these figures of the Pennsylvania system with those of one of the largest manufacturing companies in the country. The industrial corporation's annual report shows payments of \$160,825,822 for the wages of an average of 210,180 men, against the railroad's payment of \$155,015,898 to an average of 199,000 men in the prosperous year 1907, yet when the slump came in 1908 the manufacturer was able to reduce his force to 165,000 men and his payments to \$120,510,829—a decrease of 45,000 men and over \$40,000,000 in wages—while the railroad company could curtail its force by but 24,000 men and thereby reduce its wage payments by \$30,000,000.

M. A. Hanna & Co., Cleveland, Ohio, have closed an important deal with the United Iron & Steel Company, according to the terms of which the ore and blast furnace properties of the latter company will be handled by the former. The United Iron & Steel Company owns a controlling interest in the Pittsburgh Ore Company, which operates five mines in the Mesaba range. Under the new arrangement M. A. Hanna & Co. will operate the mines and sell and ship the ore and will also operate and market the output of the two blast furnaces of the United Company at Leetonia, Ohio, and Middlesex, Pa.

The Machinery Trade.

NEW YORK, June 30, 1909.

The volume of business transacted the past week varied but little from that of the previous week, though a slight betterment was noted by some houses. Early in the month trade fell off a little from that of May, and it was expected that the sales sheets for June would be discouraging, but there was sufficient business booked since the middle of the month to partially offset the decrease, and it is thought that when the totals of the two months are compared those for June will be nearly equal to May. Since our last report no large inquiries or orders were reported, but those for small lots were more numerous. This has created a somewhat better feeling and houses are more confident of a gradual expansion of trade than they were a few weeks ago. There is much prospective business from the railroads, but thus far they have bought very sparingly. Reports from those who attended the convention at Atlantic City last week of the railroad master mechanics and car builders indicate that the roads are in need of a great deal of mechanical equipment, but that they will have to secure more money before they can buy extensively.

The large number of orders placed the last few months with the shipbuilding companies of both the Atlantic and Pacific coasts have turned the attention of the machinery men in that direction, and, taking into consideration the fact that the shipbuilding companies have done but very little buying the last two years, it is said that some of them will no doubt require considerable equipment to put their shops in shape to complete the extensive orders they have received. A machinery man who has just returned from a tour of the shipbuilding shops along the Atlantic Coast declares that most of them will shortly come into the market for a general line of machinery, including considerable in the way of machine tools. He was informed at the works of one large shipbuilding company that it had purchased practically no machinery in more than two years, but would soon be obliged to do some buying in order to fulfill its contracts.

The Chesapeake & Ohio Railroad has awarded contract to Westinghouse, Church, Kerr & Co., New York, for the construction of additional shops at Huntington, W. Va., for which considerable new machinery will be required. Such equipment as will be needed will be bought either through the purchasing department of the railroad or Westinghouse, Church, Kerr & Co., dependent upon which party can obtain the best prices. A new planing mill will be built, the equipment for which has been purchased. The building now used as a planing mill will probably be converted into a boiler shop. The other construction work will include a new power house, extension to the blacksmith shop and a new storehouse and office building. J. F. Walsh is superintendent of motive power, with headquarters at Richmond, Va.

The Charlotte Harbor & Northern Railroad will erect shops at Arcadia, Fla., to include a machine shop, 60 x 120 ft., storehouse, oil house, carpenter shop, paint shop, roundhouse, &c. About \$3000 worth of machinery for making repairs will be installed, bids for which have not yet been asked. E. C. Bagwell, Hull, Fla., is superintendent.

The Cutler-Hammer Mfg. Company, 50 Church street, New York, with works at 79 East 130th street, New York, manufacturer of electrical controlling devices and other electrical equipment, has filed plans for a five-story building to be erected on the north side of St. Joseph street, between the Southern boulevard and Simpson place, New York. The building will be 85 x 150 ft., and from all accounts the machinery equipment has not yet been purchased. Mr. Hubbell, whose office is located at the works, has charge of the details.

The General Electric Company, Schenectady, N. Y., placed a number of good sized orders for equipment in this territory last week, and from inquiries now in the trade, those who know of the company's affairs say, there is considerable more buying to be done. The company recently built an extension to its Schenectady works, with a view to systematizing and enlarging its drop hammer department, and the addition is now being fitted up in order to have all the drop hammer equipment in one structure. This arrangement will necessitate a rearrangement of the brass working shop and there may be some additions there. Considerable extensions have been under way at the Eddystone, Pa., works of the company and that plant from all accounts is calling for additional machine tool equipment. As has been stated before, the company intends to make the Eddystone

plant an important one in its system and with a betterment in the business situation further extensions may be looked for there.

Plans and specifications for the new plow and cultivating implement manufacturing plant to be erected by B. F. Avery & Sons, Fifteenth and Main streets, Louisville, Ky., now being prepared by George M. Brill, engineer, Marquette Building, Chicago, Ill., will be completed and ready for bids July 7. There will be 11 buildings, with a total floor area of nearly 10 acres, and bids will be received on the buildings erected complete, also on separate parts as follows: 1, excavating, grading and concrete work; 2, brick work, cut stone and terra cotta; 3, timber and carpenter work; 4, mill work; 5, steel work and railings; 6, cast iron work; 7, roofing; 8, sheet metal work; 9, painting and glazing. The erection of this plant will necessitate the installation of considerable new machinery, but neither the hardware nor any equipment for the buildings is included in these plans and specifications. Prospective bidders applying for plans and specifications will state the part upon which they expect to bid. The plans and specifications will be on file at the offices of the owner and engineer, and copies may be obtained from the former, for which a deposit of \$35 will be required for a set for the entire work or any part indicated by Nos. 1, 2, 3, 5 or 9, of which \$20 will be refunded upon their return. For any part indicated by Nos. 4, 6, 7 or 8 a deposit of \$25 will be required, with a refund of \$20.

The American Car & Foundry Company, 165 Broadway, New York, has under construction at St. Charles, Mo., a new plant which will have a capacity of 40 passenger coaches a month, and considerable equipment has already been bought for the plant, which, it is expected, will be in commission before fall. The company has about completed a large addition to its foundry at South St. Louis, for which considerable machinery was purchased some time ago.

A great deal of mechanical equipment will be purchased by the Dain Mfg. Company, Ottumwa, Iowa, for equipping the new plant now in course of construction at Welland, Ontario. This plant, which will provide for the employment of about 150 men, will be 60 x 360 ft., with two 1s 60 x 200 ft. The company is not yet in a position to state just what its requirements will be, but it will have to purchase the complete equipment for the foundry, machine shop and wood shop. Electric power will be used throughout, each machine to be driven by an individual motor. The heating plant will be centrally located and the fan system will be employed. The plant will be built for the manufacture of hay stackers, unloaders, presses, racks and mowers.

The Cole Mfg. Company, Charlotte, N. C., will build a new plant at a cost of about \$50,000 for the manufacture of farm implements, cotton planters, &c. A site of about 15 acres has been selected, and though plans have not yet been completed it is the intention to erect buildings of either brick or concrete and two or three stories high. The plant will be operated by electricity secured from the Southern Power Company.

Ford, Bacon & Davis, 115 Broadway, New York, have charge of considerable trolley extension work on the lines of the United Railroads of San Francisco, in the suburbs of that city. All of the details relating to the trolley additions have not been worked out as yet, but in addition to reconstructing some old lines several miles of extension work are in contemplation. This will include the purchase of equipment to generate about 20,000 kw. of power for some of the substations.

The Superintendent of Public Works, Albany, N. Y., last week opened bids on three additional large canal contracts, involving the expenditure of nearly \$4,000,000. The lowest bid for the construction of 14 miles from Little Falls to Sterling Creek was submitted by the Acme Engineering & Contracting Company, New York, at \$2,591,666. For installing machinery for dams, one bid was received from Longenecker & Co., New York, for \$109,940. The Shanley-Morrissey Company, New York, submitted the lowest bid for the construction of 9 miles of canal from Herkimer-Oneida County line through Utica to Oriskany. It agreed to do the work for \$1,163,625.

Encouraged by the recent offer of the Bradley, Gaffney, Steers Company to build a system of subways in New York, the Public Service Commission has adopted measures, which, if everything goes as is expected, will enable it to make definite plans, so that bids on construction work can be advertised in the near future. In putting the matter before the Board of Estimate the commission suggests that the advertising for bids shall be done in such a way that a variety of plans can be considered.

The Syracuse Safe Company, Orange and Water streets, Syracuse, N. Y., is having plans prepared by Engineer Wellington Taber, Onondaga County Bank Building, Syracuse, for a new plant to be erected at Canal street and Teall avenue. The main building is to be one and two stories, 65 x 318 ft. The company is engaged in the manufacture of safes, vaults, doors and linings. The machinery required will consist of boiler, engine, generator, motors, machine shop equipment and overhead cranes.

Chicago Machinery Market.

CHICAGO, ILL., June 29, 1909.

Reports from the various machinery houses indicate more or less unevenness in the distribution of business during the present month. In a majority of cases, however, actual sales for June show some falling off as compared with those of the previous month. The business of a few dealers who make a specialty of heavy tools for railroad shop equipment has been swelled by orders placed within the past two weeks by the Chicago, Milwaukee & St. Paul Railroad. The tools covered by these transactions were included in the list put out by this company about two months ago and published May 11 in the machinery columns of *The Iron Age*. Aside from these purchases only a few scattered inquiries have lately been received from the railroads. The largest transaction reported last week in this market from other sources was an order for 19 tools for the new shops of the Lackawanna Bridge Company, Buffalo, N. Y., taken by a prominent local interest. This equipment included punches, shears, plate planers and other machines required for structural work, the entire order amounting to about \$25,000. There is a fair amount of new inquiry, the majority of which concerns requirements of the smaller manufacturing plants, but the proportion emanating from the larger interests, including makers of railroad equipment and supplies, is gradually increasing. Business in boiler shops is beginning to pick up, and the demand for steam engines in large units is considerably improved.

The Vaughn Company of Detroit, Mich., manufacturer of concrete floors, has moved to Chicago, occupying offices at 145 La Salle street. A subsidiary company known as the Chicago Concrete Lumber Company has been formed with a capital of \$100,000, to erect what is termed a concrete foundry for the manufacture of floor joists, columns and girders of concrete under the Vaughn system. The machinery required for the equipment of this plant will include electric traveling cranes, derricks, tram cars and elevating machinery. About \$30,000 will be expended upon this improvement, work upon which will be started within 60 days.

The Indiana Brass & Bronze Company, Marion, Ind., maker of brass, bronze and aluminum castings, has under construction new buildings that will practically double its casting floor space, which at present embraces 3000 sq. ft. The work, which has heretofore been limited to castings only, will be supplemented by a finishing department, for the accommodation of which the company is building a machine shop, 60 x 80 ft., which is to be equipped with modern tools for machining and finishing brass, bronze and aluminum castings. It is expected that these additions will be completed within the next 60 days, when the working force now amounting to 60 employees will be largely increased.

The F. C. Richmond Machinery Company, Salt Lake City, Utah, has increased its capital stock from \$100,000 to \$150,000.

The Messenger & Parks Mfg. Company, Aurora, Ill., maker of sheet metal goods for buildings, is erecting a new factory, 115 x 136 ft., one story and basement. The principal part of the machinery for this plant has already been purchased, the only machinery for which the company is now in the market being a few motors. It is intended to have the plant ready for operation about September 1.

The erection of a 25 stall roundhouse at Terre Haute, Ind., is contemplated by the Vandalia Railroad. It is stated that the construction of shops in this connection is not included in present plans and the equipment required will be restricted to the few tools needed for light repairs. W. C. Arp, Terre Haute, Ind., is superintendent of motive power.

Having recently contracted to supply a large amount of electric current for the operation of a neighboring mine, the Copper Creek Mining Company, Copper Creek, Ariz., is arranging to enlarge its power plant equipment by the installation of a 300-kw., 2300 volt, 60 cycle, 3 phase electric generating unit direct connected to a cross compound condensing engine.

Improvements contemplated by the Grand Forks Street Railway Company, Grand Forks, N. D., will require the purchase of power plant equipment, including one 100-kw. belted generator and one 250-kw. generator direct connected to a compound condensing engine, together with boilers, heaters, switchboard and other electrical apparatus, on all of which tenders of second-hand equipment will be considered.

The trustees of Grinnell College, Grinnell, Iowa, have decided to install a new heating plant, which will include an electric light plant. A battery of five boilers will be in-

stalled, two of which will be new. These are to be equipped with some type of smoke consumer which has not yet been selected. In connection a deep well is to be sunk and an elevated tank constructed to supplement the water supply.

The Cutler-Hammer Mfg. Company, Milwaukee, Wis., has purchased the plant, business and patents of the J. L. Schureman Company of Chicago. The manufacture of the well known type of Schureman controlling apparatus will be continued and all agreements and contracts made by the Schureman Company will be carried out by its successor. The services of F. M. McFedries, general manager of the Schureman Company, have been retained by the Cutler-Hammer Mfg. Company and he will remain in active charge of the manufacture and sale of the Schureman apparatus. J. L. Schureman retires from the business. Until further notice communications should be sent to the old address, J. L. Schureman Company, 70 West Jackson boulevard, Chicago, or to any of the offices of the Cutler-Hammer Mfg. Company.

In connection with the building of its new factory building, 60 x 640 ft., two stories, of brick and steel construction, the Rapid Motor Vehicle Company, Pontiac, Mich., will erect a power plant. For the equipment of these buildings the company will probably expend from \$75,000 to \$100,000 for metal working and other kinds of machinery.

New England Machinery Market.

BOSTON, MASS., June 29, 1909.

The protracted spell of hot weather had its influence on the business of the dealers and has been felt to a certain extent by the manufacturers. It is not for this reason, however, that June will foot up smaller totals than May, but this was considered inevitable, as the summer depression usually begins before the advent of July. There is no change in the underlying sentiment in business circles and no one doubts that the summer will be by no means dull and that autumn will see a rapid increase for the better. The foundries are busier practically everywhere and already there is talk of an important increase in productive capacity, in the belief that present facilities will not take care of the business which should come later in the year.

The first section of the great repair shops which the Boston & Maine Railroad will establish at Somerville, Mass., will be 170 x 203 ft., one story, and will be known as the "running repair" shop. It will be of steel construction, and work will begin this summer, so that it should be ready for its machine equipment before the end of the year. The preliminary work will take some time, as a pile foundation will be necessary. The cost will be about \$200,000. An elaborate system of tracks will be laid out to serve this building as well as those planned for the future.

The plans for the new plant of the Holmes Mfg. Company, New Bedford, Mass., textile manufacturers, include boiler and engine house, 86 x 110 ft., three pump houses, 20 x 20 ft., and a main spinning mill, 132 x 534 ft., four stories.

The business of John S. Fray & Co., Bridgeport, Conn., manufacturers of Spofford braces, sleeve ratchet and drill braces, has been incorporated under Connecticut laws as the John S. Fray Company, with capital stock of \$125,000. John S. Fray is the president and Joseph T. Fray secretary and treasurer. The incorporation means no change in the business nor in its management, the former partners remaining as the officers.

The Chandler & Farquhar Company, Boston, Mass., has taken the agency for the oil stone grinding machines built by the Mummert, Wolf & Dixon Company, Hanover, Pa.

Landers, Frary & Clark, New Britain, Conn., manufacturers of hardware specialties, will increase their works this summer by a one-story brick addition, 45 x 90 ft., for the glazing department; a one-story factory building, 26 x 126 ft., and a new power plant, of which Lockwood, Greene & Co., Boston, will have charge of the construction and installation.

The Bristol Engineering Corporation, Bristol, Conn., manufacturer of taxicabs and automobile parts, is looking for a site in Bristol upon which to build a new factory, the need of which has followed a very rapid increase in the company's business. A local report that the company is to occupy the old plant of the Pope Tube Works, Hartford, Conn., is pronounced to be without foundation, the company having no idea of leaving Bristol for the present.

The car builders of New England report business on the rapid increase. The Wason Company, Springfield, Mass., is much nearer a normal working force than it was a few months ago, and the Laconia Car Works Company, Laconia, N. H., has received substantial orders, including a recent

contract for 40 semi-convertible cars for the Massachusetts Electric Company, totaling about \$200,000. The report comes from the car people that the railroads are placing more business, and that there are indications of more substantial orders in the near future.

The business of builders of machinery used in hat making has been given an impetus as the result of the recent hatters' strike at Danbury, Conn. An outcome of the labor trouble was the establishment of a number of new factories in that place and vicinity, and these had to be supplied with special equipment. The Turner Machine Company, Danbury, is very busy because of recent orders from these sources.

Plans have been accepted for the new industrial school to be established at Worcester, Mass. The site will be at Armory Square, near the North Works of the American Steel & Wire Company and the Hobbs Mfg. Company. The building to be erected this season will be about 60 x 280 ft., four stories at one end, on the principal street, and three stories for the remainder of the structure. The first floor will be given over to the heavier machinery, with boiler and engine room at the rear. On the second floor will be a machine shop 40 x 200 ft.; tool making and die cutting room, 20 x 40 ft.; blacksmith shop, 22 x 55 ft., and a casting room opening upon spur track from the Boston & Maine Railroad. The woodworking department will be on the third floor, together with recitation rooms, &c. The school will devote itself to the development of men employed in the metal trades, principally machinists, and will be conducted on an eminently practical basis, under the direction of men prominently interested in the industries of Worcester which require the services of these classes of workmen. The building committee consists of Milton P. Higgins, of the Norton Company, Norton Grinding Company and Worcester Pressed Steel Company; George I. Alden of the Norton Grinding Company, George F. Brooks of the Harrington & Richardson Arms Company, Professor Levi L. Conant of the Worcester Polytechnic Institute and J. M. Buckley. The building as described will be extended later to give it a four story frontage of 200 ft., and wings for foundry and shop purposes. As it is planned to begin building almost immediately equipment will have to be provided in the near future.

Announcements of new building to increase general manufacturing plants include the following: Bates Street Shirt Company, Lewiston, Me., new building, 100 x 150 ft., four stories; Franklin Felt Company, Franklin, Mass., a new concern with \$80,000 capital stock, new mill at Franklin; Goodall Worsted Company, Sanford, Me., two story addition; Bennington Mills, Burlington, Vt., addition, 96 x 123 ft.; M. J. O'Malley, Springfield, Mass., printing, new building, 45 x 196 ft., three stories and basement.

The Carlyle Johnson Machine Company, manufacturer of the Johnson friction clutch and marine reverse gears, is now located in its new plant at Manchester, Conn., nine miles east of Hartford on the Willimantic division of the New York, New Haven & Hartford Railroad, where it has much better facilities for handling its increasing business.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 29, 1909.

Business with the local machine tool dealers has been quiet the past week. Inquiries continue to come in, but the most of them are for one or two tools. Some fairly good business is pending, but buyers who are considering the purchase of a number of tools are slow in placing orders. Taken as a whole, June has been rather a disappointing month. The majority of the machine tool houses report that the volume of sales during the month showed a slight falling off as compared with May. The market has broadened out somewhat, however, not being so dependent upon the automobile builders and allied industries as it was, and dealers feel that the general outlook is fairly satisfactory. The demand for second-hand tools is good.

Business continues to improve with the local machine tool builders, a number reporting their June sales considerably larger than those of May. There is a better demand for some lines of heavier machinery, orders for forging machinery in particular showing an increase. Orders from railroads show an improvement. A good volume of inquiries for locomotive cranes has developed from this source and these are expected to result in the placing of orders soon after the beginning of the new fiscal year, July 1. Orders for gas engines picked up considerably during the month.

In the foundry trade the demand for light gray iron castings continues to improve, and some of the larger foundries now have about enough work on hand to keep their plants running full.

The Standard Welding Company, which completed a new plant only about a year ago, has already found its capacity too small and has let the contract for the erection of an

addition to provide more room for its tubing and rim departments. The new building will be a brick structure, one story and basement, 130 x 215 ft., and will provide 56,000 additional square feet of floor space. Orders for a large share of the machinery equipment, including motors, forging machines, planers and draw benches, have been placed. The company has been operating its plant at full capacity 22 hr. per day for some time. While the heavy demand from the automobile trade has been largely responsible in keeping the plant taxed to its utmost, the company reports an increasing number of orders from other sources, and orders from automobile builders show no signs of falling off.

Bids for the elevators and machinery for the new Cuyahoga County Court House, Cleveland, will be received by the County Building Commission July 14. The plant will include seven electric passenger elevators operated by motor driven drum winding machines and one hydraulic plunger lift. Plans and specifications can be seen at the offices of the Building Commission and French & Hubbard, engineers, Boston, Mass.

Finding the size of its plant inadequate to meet the needs of its growing business, the American Roll & Foundry Company, Canton, Ohio, has decided to build additions to its foundry and machine shop. Some new machinery will be installed. The company has placed an order with the Case Mfg. Company, Columbus, Ohio, for a 25-ton crane with a 5-ton auxiliary for its machine shop.

The McMyler Mfg. Company, Cleveland, reports a decided improvement in the business outlook for the balance of the year. The company recently received a number of inquiries for locomotive cranes, and these inquiries are expected to result in the placing of considerable business soon after July 1.

The Ajax Mfg. Company, Cleveland, reports a continued improvement in the demand for forging machinery. It recently secured some good orders and is now running its plant at full capacity.

The Cleveland Roofing Nail Company, Cleveland, has been incorporated by L. L. Norman, G. B. Riley, A. M. McGee, J. R. McQuigg, H. H. Kuckle and A. H. Mills.

Milwaukee Machinery Market.

MILWAUKEE, WIS., June 29, 1909.

During the past week business has not been quite as active as it was earlier in the month, but this applies only to orders actually booked. Inquiries and requests for detailed bids on specifications continue to be received in large numbers. Of these the Western and Northwestern States furnish considerably more than their normal proportion, and the bulk of the business involves construction projects of one kind or another. Altogether, it is a character of trade which augurs extremely well for the future, as fully 60 per cent. of the orders placed at present with machinery builders in this section represents but the beginning of new installations, extensions or improvements to be made during the coming 6 to 18 months. In the longer period mentioned are comprised developments that, with the utmost speed, it will require more than a year to complete. This is a feature of the existing situation which it will pay manufacturers throughout the country to bear closely in mind; for among the most profitable trade to be obtained during the late summer and fall months is that which will require much skill and patience in handling, not only up to the point where initial purchases are made, but especially beyond that stage. In many instances, also, long-time credits will be required, and careful judgment needs to be exercised at the beginning in discriminating between sound and unsound projects. Salesmen should be cautioned to give very full and exact reports on apparently favorable prospects, and local conditions ought to be very explicitly considered before any large line of credit is extended. Indications all point to a far more conservative development of new enterprises than obtained before the panic, but purely promotion schemes are already being exploited to a considerable extent; machinery builders here have found it advisable to turn down more than a little business which looked well on the surface and had been secured by their salesmen after sharp competition.

Two horizontal tandem double-acting gas engines, to be direct connected to 60-cycle alternating current generators, are being built by the Wisconsin Engine Company, Corliss, Wis., for a new power plant in Oklahoma.

An addition to the foundry of the Northwestern Steel & Iron Company, Eau Claire, Wis., will be completed this summer and some new equipment is to be installed, with probably more in the fall.

The factory of the G. B. Lewis Company, Watertown, Wis., which recently burned, is to be rebuilt. It has not yet been decided whether to install a new power plant or buy electric current for operating motors.

A small pumping plant is to be erected by the city of Hartford, Wis.

The Dells Paper & Pulp Company, Eau Claire, Wis., is taking bids on part of a new power development at Davis Falls.

It is stated here that the Racine Steel Casting Company, Racine, Wis., will make extensive additions to its plant, including the erection of new buildings.

The Jacob A. Volrath Mfg. Company, Sheboygan, Wis., whose need of a larger plant was referred to in this paper some months ago, has decided to erect a new group of buildings this year and probably duplicate them next season, at which time a power station of considerably increased capacity will be required. As this is one of the largest manufacturers of enameled sheet steel and cast iron wares in the world, its further expansion means the purchase, in due course, of a good deal of machinery.

The South Side Steel & Malleable Casting Company, Milwaukee, which has been putting in an additional 10-ton cupola and other foundry equipment, contemplates installing a new power plant.

The Harley-Davidson Motor Company, Milwaukee, has had plans prepared for an addition, 90 x 120 ft., of brick and steel, with new steam boiler.

The construction of the Milwaukee Western Electric Railway from Milwaukee to Beaver Dam, a distance of about 60 miles, will begin the latter part of August. It is probable that a power station equipped with either gas engines or steam turbines will be located at a point nearly midway.

The Snow Mountain Power Company, Eureka, Cal., which was equipped with Milwaukee built machinery, is preparing to install an additional hydro-electric unit doubling the present capacity of its plant.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 29, 1909.

Minor evidences of a buying movement on the part of the railroads, manifested through correspondence and in other ways to machine tool builders in this territory, are assuming form as the beginning of another fiscal year approaches, and to-day it is difficult to find a tool builder who has not confidence enough in the future to fortify his shop forces and increase his stock reserve so that he may not be caught short. Some very good sales are already assured and of these heavy drills have a place at the head of the list, one of the largest concerns making uprights and radials receiving orders for seven in practically one mail. Milling machines continue as leaders, however, and the forces engaged on this type of tool in this section are practically normal.

From scattering reports from the railroads operating in this central territory it is estimated that within 85 to 90 per cent. as much tonnage is being handled as in 1907, when they were operating to capacity. In some quarters it is expected that the high water mark of that year will be reached by August 1.

Dealers in this market will report for the first half year a normal six months' volume of business, the last two weeks of June being considerably better than the first two. The business, however, has been of the spotty character. It has come in what might be denominated "bunches," a one day's sales record often showing more business than four or five preceding.

A local dealer who watches the trend of the market very closely says: "A good percentage of sales now being made are to manufacturers who have had inquiries in and, although needing the tools badly, have procrastinated. They put off buying when they could have had immediate delivery and now are all coming in at once, which naturally delays deliveries more and more, and are annoyed because they cannot get them." On some types of tools dealers are able to give practically immediate delivery, but as a rule from two weeks to a month are required.

The month now closing will see a considerable change made in shop equipment throughout this territory. There have been many deals of the exchange character—old tools turned in on new machines. Prices, which showed a tendency to cutting earlier in the year, have stiffened within the past month or six weeks, and as a rule cutting is an infrequent occurrence.

The foundries are gradually taking on men and acquiring iron. The improvement is slow, however, among the concerns making a specialty of castings for the machine tool builders.

A very interesting set of statistics has just been finished by Assistant Secretary Manley of the Cincinnati Metal Trades Association. These are figures showing the business condition at quarter periods since June 15, 1907, which was taken as the base for computation. The Cincinnati branch is one of the largest and most important of the organizations making up the national body, and its central location and the pre-eminence of its membership in the size

of plant, volume of output and general business conditions should be fairly representative of the whole. Reference to the figures will show that the upward trend began in December, 1908, since which time the recovery has been slow but steady, and that manufacturers as a whole are but 35 per cent. behind the record of June 15, 1907, universally regarded as abnormally heavy. Accepting as the basis of computation June 15, 1907, as 100 per cent., it is shown that the output on September 15, 1907, was 97 per cent.; December 15, 1907, 85 per cent.; March 15, 1908, 67 per cent.; June 15, 1908, 56 per cent.; September 15, 1908, 53 per cent.; December 15, 1908, 56 per cent.; March 15, 1909, 62 per cent.; June 15, 1909, 65 per cent.

The large foundry of the Peck-Williamson Company which has for several years been operated at Wellston, Ohio, and which was shut down a few weeks ago owing to a strike of the workmen, will be dismantled, and the company expects by August 15 to have in operation its new foundry at Oakley, in the new machinery colony of which it is a part. The company had on hand a good stock of castings when the trouble at Wellston occurred and was not seriously inconvenienced by the shutdown. The machinery and portions of the Wellston plant are being moved to Oakley. Something like 200 men will be employed in the foundry department.

The Franklin Foundry Company, Columbus, Ohio, has been incorporated, with a capital stock of \$10,000, to make gray iron castings, by Gilbert H. Hamilton, John M. Charles, John J. Keen, Mrs. Gilbert H. Hamilton and Mrs. Ada Rees.

Local tool makers are greatly pleased with the way in which the city school department took hold of their committee's idea of continual schools for workmen. It is now announced that the school will be opened August 2 in the Third Intermediate Building on Woodward street. Wilbur Denison, a foreman at the R. K. Le Blond Machine Tool Works, was selected to be the teacher, but has declined to accept the position, which will necessitate another appointment, and this may not be possible before the return to the city of Superintendent Dyer of the public schools on August 15.

Robert A. Le Blond was named by Judge Hoffheimer as receiver of the Carrico Motor Company, organized to build and sell motor cars a year ago. The assets are estimated at \$7500 and the liabilities at half that amount.

The somewhat unusual happening of a plant shutting down because of the failure of a furnace company to deliver iron in sufficient quantities on contract is recorded as the reason for the suspension of the Wheeling (W. Va.) Enameled Iron Company for about two weeks recently. On the arrival of the iron the plant was started up full capacity.

A new steel mill to be located at Kenova, on the boundary line of Kentucky, West Virginia and the Ohio River, is to be rushed to completion, work having commenced on it already. The final details and location of the plant were decided upon by the directors of the Kenova-Huntington Land Company last week and a West Virginia charter was secured by the Independent Steel Company of America, which is back of the deal.

The International Steel & Iron Company, Evansville, Ind., reports good business for the close of June, with some excellent contracts for iron work on new buildings, store fronts, &c., in Indiana and Kentucky.

A large locomotive plant is one of the improvements to be carried out by the Wheeling & Lake Erie Railroad during the summer and fall. This will be located at Brewster, at an approximate cost of \$200,000. A coal tippie, repair shop and storehouse will also be located there.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 29, 1909.

The market continues somewhat irregular. While slight gains are reported by some merchants as well as tool builders, others, and these are in the larger proportion, note no real betterment in the demand. Buying is confined usually to small sized propositions, the only transaction of any importance recently being the purchase of some \$12,000 to \$15,000 worth of tools by the city for the Southern Manual Training School, which has been before the trade quite a long time and was materially reduced from the original before being finally placed. The equipment included a number of small and several large lathes, planers, shapers, drills, grinders and miscellaneous small tools. Notwithstanding the rather light buying, the trade looks at the situation optimistically. While the month's business has fallen below the volume transacted in May, it shows a gain over the corresponding month last year. No great volume of new business is expected to develop in July, but the trade feels encouraged by the continued betterment to be noted in the iron and steel trade, which is expected to have a beneficial effect on the machine tool trade generally, probably early in the fall. Inquiries for tools have not been plentiful; medium

sizes for plant extension have been in fair demand, but for the heavier types rather scattered. Tools of a special character have been fairly active, particularly textile machinery, builders of which have been fully engaged for some time. Those making the smaller class of tools of a general nature also keep busy; builders of equipment of the heavier type, however, have not booked any extensive volume of business, although the outlook is reported better.

The market for second-hand machinery and tools continues irregular. Business is largely of a day to day character and is confined for the most part to equipment of the medium and smaller sizes. The second-hand boiler and engine trade is only fairly active, although some good business in new boiler installations, as well as for engines of the higher horsepower, is under consideration, but propositions of this class develop rather slowly.

The foundry trade shows some slight betterment. General jobbing foundries have had a larger run of orders, while the demand for machinery castings is a shade better. Crucible steel casting plants are busy, but the larger steel casting plants report only moderate gains. The situation, on the whole, however, is somewhat better, and a greater improvement is anticipated in the near future.

Bids were opened during the week by the Department of Public Works of this city for a 45,000,000-gal. centrifugal pump for the Torresdale filtration plant. Bids ranged from \$16,000 to \$25,900, that of the Dravo-Doyle Company being the lowest. Proposals for laboratory supplies and an electric haulage system for the same plant were also opened. No awards have as yet been made.

The Newton Machine Tool Works, Inc., reports a fair volume of business, but not as large as that transacted in May. Sales recently have been mainly of cold saw cutting off machines and milling machines, industrial plants being the purchasers, the railroads not having as yet been very active in machine tool buying. A moderate inquiry for equipment of different types is to be noted, and the outlook is considered encouraging, although no great volume of business is anticipated during the summer months.

Local capitalists of Bridgeton, N. J., have formed a company, to be known as the Fortescue Improvement Company, for the purpose of establishing a resort at Fortescue, on the Delaware Bay, where a pier and pavilion will be built. Part of the plan is to have the Bridgeton & Millville Traction Company extend its line from the former place to Fortescue. Theodore Felmev and J. Ellsworth of Bridgeton, N. J., are prominent in the new proposition.

Proposals will be received until July 24 by the Bureau of Yards and Docks, Navy Department, for three vertical cross compound condensing engines, together with other appliances, for installation at the Navy Yard, Philadelphia, Pa. Plans and specifications can be obtained on application to the Commandant of the Navy Yard, Philadelphia.

Application for a charter incorporating the Industrial Supply & Equipment Company will be made under the Pennsylvania laws during the coming week. The incorporators are E. Waterman Dwight, James McMullen and George S. Munson. The object is to manufacture, buy, sell and deal in machinery, tools, shop equipment, mechanical appliances, &c.

The Standard Pressed Steel Company notes a steady gain in the volume of business. This company's plant is being operated on full time to keep up with orders. A number of very satisfactory orders for pressed steel shaft hangers have been received from South America and European customers. Domestic orders have been small individually, but make up what they lack in size by the number received. The outlook is encouraging.

Government Purchases.

WASHINGTON, D. C., June 29, 1909.

The following bids were opened June 21, Circular No. 514, for machinery for the Isthmian Canal Commission:

Class 1.—One surface condenser—Bidder 1, Alberger Condenser Company, New York, \$3735 and \$4225; 19, A. S. Cameron Steam Pump Works, New York, \$4015 and \$3380; 34, Drew Machinery Agency, Manchester, N. H., \$2520; 68, Motley, Green & Co., New York, \$5683; 100, Union Steam Pump Company, Battle Creek, Mich., \$3229; 107, Wheeler Condenser & Engineering Company, Carteret, N. J., \$3295, \$3425 and \$3325; 108, C. H. Wheeler Mfg. Company, Philadelphia, Pa., \$3595 and \$3395; 111, Williamson Brothers Company, Philadelphia, Pa., \$3710; 118, Jeannesville Iron Works Company, Hazleton, Pa., \$4426 and \$4506; 125, Henry R. Worthington, New York, \$3415.53, \$175.44, \$3319 and \$3071.

Class 2.—Two 200-gal. pumps—Bidder 31, D'Olier Engineering Company, Philadelphia, Pa., \$3184; 62, Manning, Maxwell & Moore, New York, \$2350; 113, R. D. Wood & Co., Camden, N. J., \$3335; 118, Jeannesville Iron Works Company, Hazleton, Pa., \$2699; 125, Henry R. Worthington, New York, \$3434, \$2912.30 and \$3087.88.

Class 3.—Four pumps, diaphragms and suction hose—Bidder 34, Drew Machinery Agency, Manchester, N. H., \$1121.60; 88, Frank Richards & Gardiner Company, New York, \$629.90.

Class 33.—One screw cutting engine lathe—Bidder 67, Montgomery & Co., New York, \$210; 68, Motley, Green & Co., New York, \$275; 99, Tucker Tool & Machine Company, New York, \$288.

The following bids were opened June 22 for machinery for the navy yards:

Class 1.—Two furnaces—Bidder 80, Kenworthy Engineering Company, Waterbury, Conn., \$1965.20; 125, Railway Materials Company, Chicago, Ill., \$1400.

Class 61.—One No. 7 power feed rod machine—Bidder 44, J. A. Fay & Egan Company, Cincinnati, Ohio, \$839.41; 185, American Wood Working Machinery Company, Rochester, N. Y., \$603.

Class 136.—One rail cutting machine and extra saws—Bidder 91, Montgomery & Co., New York, \$191; 93, Motley, Green & Co., New York, \$129; 95, Manning, Maxwell & Moore, New York, \$142; 162, Vermilye & Power, New York, \$133.09; 194, Excelsior Equipment Company, Pittsburgh, Pa., \$208.50.

The following bids were opened June 10 for an engine and generator for the heating plant in the United States Weather Bureau Building at Washington:

M. DuPerow, Washington, D. C., \$3100; Evans-Almirel Company, Philadelphia, Pa., \$4691; National Electrical Supply Company, Washington, D. C., \$3459; King Heating Company, Philadelphia, Pa., \$855, part; York Engineering Company, York, Pa., \$3900; G. & W. Mfg. Company, New York, \$5300; J. W. Danforth Company, Washington, D. C., \$3655; M. A. Linthicum, Washington, D. C., \$3414.

The following bids were received June 18 at the Agricultural Department, Washington, D. C., for furnishing a generator set:

McKay Engineering Company, Baltimore, Md., \$4285; National Electrical Supply Company, Washington, D. C., \$2775; M. DuPerow, Washington, D. C., \$3824; American Iron Works, \$3400; Standard Engineering Company, New York, \$3900.

Under bids opened May 17 the Ingersoll-Rand Company, New York, has been awarded contract for 18 rock drills for the Isthmian Canal Commission at \$3042.

The following awards have been made for machinery for the navy yards, bids for which were opened February 16:

Cleveland Punch & Shear Works, Cleveland, Ohio, class 16, one plate bending machine, \$6500.

Hilles & Jones Company, Wilmington, Del., class 17, one punching and shearing machine, \$2496.

Niles-Bement-Pond Company, New York, class 18, one plain radial drill, \$645.

Under bids opened April 13 for machinery for the navy yards the Morgan Engineering Company, Alliance, Ohio, has been awarded class 1, one plate joggling machine, \$4555.

Under bids opened May 6, Circular No. 503, for machinery for the Isthmian Canal Commission, the Jeannesville Iron Works Company, Hazleton, Pa., has been awarded class 2, one air compressor, \$3740.

The Atlantic Company, Amesbury, Mass., has been awarded class 81, four sets of propelling machinery, \$601.76, under bids opened May 25 for machinery for the navy yards.

The following awards have been made for machinery for the navy yards, bids for which were opened June 8:

Lovekin Pipe Expanding & Flanging Machine Company, Philadelphia, Pa., class 41, one pipe expanding and flanging machine, \$10,000.

Hyde Windlass Company, Bath, Maine, class 71, one electric deck winch, \$2700.

The following awards have been made for machinery for the Isthmian Canal Commission, bids for which were opened June 14, Circular No. 512:

Manning, Maxwell & Moore, New York, class 1, one centrifugal pump and engine, \$11,500.

Chicago Pneumatic Tool Company, Chicago, Ill., class 15, one portable pneumatic riveter, \$495.

The Puget Sound Iron & Steel Works.—Plans have been prepared and preparations are being made for the erection of six buildings which will constitute the new plant of the Puget Sound Iron & Steel Works, to be located on the tidelands between Canal street and the Puyallup River at Tacoma, Wash. The company's present plant occupies a site which has been acquired by the Northern Pacific Railway for new terminals and must therefore be vacated. The proposed plant will include a foundry, 90 x 126 ft., to be equipped with a 40-ft. electric traveling crane of 50 tons capacity; a machine shop, 70 x 250 ft., with similar crane equipment; a two-story pattern shop, 50 x 110 ft.; forging shop, 70 x 90 ft., with a 25-ton traveling crane. In addition to these there will be a storehouse, 50 x 80 ft., and an office building, 30 x 40 ft., two stories. Considerable new machinery equipment will be included in the requirements for this installation, which will probably be ready for use within the next 12 months.

At the Alaska-Yukon-Pacific Exposition, Seattle, Wash., the Ferro Machine & Foundry Company, Cleveland, Ohio, is showing a large and fine exhibit of marine engines, parts and accessories. The display is located in Machinery Hall, under the name of the Seattle Marine Supply Company, Puget Sound distributors for Ferro engines. The Ferro Company has sent its Western sales manager and engine expert, W. P. Street, to take charge of it until the close of the exposition.

HARDWARE

THE Hardware trade, as the commercial classes generally, are watching the course of things at Washington with more or less solicitude, and business is to some extent held in abeyance awaiting the settling of the grave questions before Congress. The delay in tariff legislation is naturally holding back enterprise and preventing a resumption of normal industrial and commercial activity. As the time for conferences between the two houses approaches, when the real tariff bill will be decided on, there is increased interest in the subject, especially as there is a wide divergence of opinion in regard to the duties which should be imposed in some of the important schedules.

The question as to the adoption of new methods of taxation are, however, becoming of more engrossing interest to the commercial and financial classes than are those relating simply to tariff revision. This is illustrated in the letter on a subsequent page in which one of the largest and most conservative Hardware jobbing houses discusses the subject. It is safe to say that with a general disposition to regard the plans of the administration in a friendly spirit there is among business men some solicitude expressed, and more solicitude felt, in regard to the proposed taxation of corporations. There is apparently the gradual developing of an uneasy feeling concerning the federal control of corporations, public and private, large and small, which is involved in the legislation under consideration. Practical business men and those who take a conservative and balanced view of the situation are doubtful as to the necessity for so radical a measure at this juncture or the wisdom of resorting to this new form of taxation.

The practice of economy to which with such good results the people of the country generally have recently been driven is suggested as desirable also in national affairs, and with a reasonable limiting of extravagance it is generally thought that the income of the government would be sufficient. The proposal to put the burden of the new taxation on business which is transacted by corporations without laying any portion of it on business conducted by individuals awakens a more or less definite feeling of apprehension in regard to the course that will be pursued toward the corporations of the country. There is apprehension, too, that the extraordinary power intended to be lodged with those charged with the collection of the taxes might be a serious menace if exercised unwisely or corruptly. There is as yet fortunately only a half defined feeling of uneasiness, with a suggestion of lessened confidence.

Condition of Trade.

The first half of 1909 has made on the whole a very satisfactory record. There has not been the realization of some anticipations of a complete return to a full volume of business, but there has been a very substantial improvement in the general commercial and financial conditions and definite progress toward renewed prosperity. The market in Iron and Hardware products has had its vicissitudes, but the closing weeks of the six months which have elapsed since the turn of the year chronicles something of a recovery in prices and the development of a decidedly confident feeling in regard to the future of business. While in the field of commerce

and industry there has thus been a gradual and constant, though sometimes apparently intermittent and wavering improvement, the forces of nature have been at work with a success which is recorded in the abundant harvests which will soon not only reward the husbandman for his labor but contribute most liberally to the national wealth, and ultimately stimulate all the activities of trade. The vacation season thus approaches under circumstances which taken all in all cannot but be regarded as eminently satisfactory. There is indeed as is natural something of a lull in business, partly because the important needs of the trade were covered by recent purchases and partly under the influence of the summer and in view of the entrance on the vacation season. There is, however, a reasonable movement in trade, and the retail merchants of the country generally are carrying on their business steadily and with quickened enterprise. There is no disposition on their part to speculate in goods or to carry larger stocks than usual. On the other hand, there is still a tendency to go a little slow in the purchase of Hardware, so that in many lines the merchants are less fully supplied than is usual under normal conditions. The jobbers are in general well equipped to supply retail merchants from well assorted though not over heavy stocks. Their service is usually prompt and efficient, a matter to which they are giving constant attention, recognizing that the standard established by the leading houses is very high and that good service is essential to their success in these days of improved methods. During the past week the Hardware market has developed few changes in price. The general tone is good, with a tendency toward strength in some directions.

Chicago.

The advent of warmer weather has had a stimulating effect on some lines of seasonable goods in which the movement has hitherto been backward. This is notably true of Wire Cloth, the demand for which has greatly increased in the past week or 10 days and is now quite urgent. Ruled by the extreme conservatism which marked the buying for future requirements earlier in the season, most dealers placed light orders for spring delivery, and the number of reorders coming in indicate that stocks are already running short. It is also probable that not a few dealers were depending entirely upon jobbers' stocks for their supply of Wire Cloth, and now that the trade has fairly opened up are calling for prompt shipments. The leading distributors say that not for several seasons has the volume of store shipments in this line been as great as at present. No untoward developments in market conditions have appeared to cause anxiety as to the progressive growth of business. Reports from the Southwest, where the harvesting of small grains is now in progress, indicate a fairly satisfactory yield, and it is stated upon good authority that the acreage in the corn belt is unusually large, and, though the crop is somewhat backward in some sections of the country, there is every reason to expect a bountiful crop. The industrial situation is being sensibly strengthened by a more active demand for material by the railroads. Car shops engaged in new construction and repair work are getting more work, and though much idle capacity remains to be filled there are numerous prospective orders in sight which when placed will go far toward reviving this lagging industry. It is easily recognized that a quickening of activities in car building will be immediately reflected in a better demand for several leading lines of Hardware, such as Bolts, Nuts, Screws, Nails, &c., which enter largely into car construction. The indi-

cations are that the volume of business for the present month will show a considerable increase over that of the same period a year ago. All lines of Hardware, it is true, have not shared equally in the betterments that contribute to this result. Values in some lines still remain at an unsatisfactory level, yet viewed as a whole the market is tending toward a firmer maintenance of prices.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Business conditions continue good. The weather has been favorable and crops have come on well and the prospects are now decidedly encouraging. We may expect that the coming five or six weeks will bring us about to harvest and that will tell the story for most part. All that we can now say is that conditions have seldom been better at July 1.

Our business interests are watching closely the outcome of tariff legislation now before Congress, and just now the proposed tax on the net earnings of corporations is being carefully considered. We believe that among thoughtful, conservative men there is great doubt as to the wisdom of providing for such a tax. There are certainly some very strong objections to it, and it does appear that the necessities of the Government should not be such as to require a tax of this character at this time.

Of course, with that large class of people who are always ready to approve of anything that hits corporations, such special legislation as this bill proposes meets with favor. No argument with them is necessary or profitable.

There is also a large class of men who are fair-minded and who feel that in enforcing such a tax the people who are most affected and who will suffer most under it are the rich—the multi-millionaires—who have not been bearing their full share of the public burdens of the Government.

But in the event of such legislation the strong probabilities are that these moneyed interests would find ways to evade the large part of the tax. In our opinion it may be considered impossible to draft a bill that will prevent such evasion, and the result will be that the great moneyed interests will largely escape the tax, while the large body of mercantile and industrial corporations will be called on to pay it. It is a great mistake to overlook the fact that very many corporations number among their stockholders people of limited means who are depending to more or less extent on such investments for their living.

Probably the most objectionable feature of such a tax is the unfair discrimination made by it between corporations and partnerships. A partnership concern might have a much larger capital than a corporation and also corresponding net earnings, and yet the partnership, under the operation of this law, would wholly escape the tax, while the corporation, under an honest statement, would pay it. This is wholly unfair and should not be tolerated.

The public interests are largely benefited by the legitimate use of corporations in the conduct of business, and such legislation as this would be taking a long step backward. With such a tax in force partnerships would be sure to come back again into more favor and the public would be the loser.

It cannot be urged that corporations should pay such a tax in return for special benefits which they receive through their franchises. These benefits, if any are received, come from the State and not from the Federal Government, and the corporation pays an equivalent to the State for such benefits when it receives its franchise.

We believe that it is justly a matter of great regret and is a mistaken policy for the expenditures of the government to be carried on upon the present scale, and that if it were not for such extravagant expenditures no such direct tax as this would be necessary.

Taking the expenditures, however, as they are, if any direct tax on the public is necessary to meet the conditions, an income tax making a reasonable exemption and carefully drawn and rigidly enforced, that would require all men to pay this tax whose income would meet the requirements, is a form of taxation that is much the

fairest and, we believe, is one that can be enforced without serious difficulty in the present state of public opinion. The necessary legislation for such a tax should be passed, and also provision made for submission of the necessary amendment to the Constitution. If Congress would proceed to pass such legislation there is no reason to doubt that by one year from next January such a law could be in operation, and it is better to take this additional time and have a tax that is fair to all people concerned and one that treats them alike before the law.

As a measure of additional relief why not resort again to the stamp tax, requiring stamps on bank checks, drafts, transactions in stocks, deeds of transfer, mortgages, &c. This is not a burdensome tax and is free from the charge of being unfair class legislation.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Timely rains have helped the various crops. The outlook in this territory for abundant harvests is at this time especially flattering. The wheat crop is now made and several farmers in the vicinity of St. Louis have told me they never raised a better crop of spring wheat, either in quality or in number of bushels to the acre. A good corn crop in the Southern States is made. It is progressing nicely in this and neighboring States.

We have had fine strawberries. Peaches are now coming in. There will be a bumper fruit crop and all kinds of Hardware that go to the handling and preserving of fruit will be in heavy demand.

On account of the rains all the country in the Central West is dressed up in its best suit of green. The spring has been cool and pleasant, but recently we have experienced some warm weather, but it has not been quite as torrid as in the East. We express our sympathy to our friends in the Hardware trade in New York and Philadelphia.

St. Louis, as a matter of fact, has a delightful summer climate. This city should be the great summer resort of the West. When our friends in the East desire a cooler temperature and a pleasant change we extend to them a cordial invitation to come out and spend their vacations with us. The idea current years ago that St. Louis was a hot city in the summer time has long since been exploded. We have not had a disagreeable summer since the dry year of 1901, and then not only St. Louis, but the entire country, sweltered.

The city of St. Louis is now making preparations to celebrate the one hundredth anniversary of its city charter. The week selected is that of October 3-9. That entire week will be given up to various street parades, historical pageants and meetings of civic bodies.

For the first time in the history of the country a municipality has officially recognized its traveling salesmen. St. Louis has called upon her sales managers to interest all the salesmen traveling from this city in boosting the centennial. St. Louis traveling salesmen will distribute coming cards with appropriate historical matter engraved on them.

Recently there has been formed in St. Louis a Sales Managers' Association. This association is composed of the sales managers of all the leading manufacturers and jobbers of this city. The object of the association will be to lead to co-operation between the various interests of the city in working for the development of St. Louis trade.

During Centennial Week it is proposed to have a salesmen's convention. Each St. Louis house will have its "crack" salesmen attend. This convention of salesmen and sales managers will discuss the best methods of increasing the selling power of this city.

In Centennial Week there will also be a convention of retail merchants. This convention will be addressed by experts of national reputation on such subjects as advertising, show windows, store arrangement, salesmanship, bookkeeping, buying, and other matters of special interest to retail merchants of the Central West. It is proposed to have the lectures illustrated with stereopticon views and to have the actual work of dressing a show window done in the presence of the merchants.

The idea is to have this one of the most practical

conventions of retail merchants that has ever been held in this country. No national subjects will be discussed. There will be nothing of politics or religion. The questions discussed will be practical, every day questions that come up with a retail merchant in conducting his business.

The committee in charge states that this convention will be kept free from attempts to advertise any special St. Louis interests, the object being to bring the merchants, jobbers and manufacturers of this city as a whole in closer contact with the retail distributors in their territory.

Business is good, and our sales in June are running ahead of May this year and are showing a very handsome increase over June of last year. The railroads are loosening up. It looks to us as if we could say, without danger of giving a false alarm, that Dame Prosperity has once more got her finger pushing at the button on Uncle Sam's front door bell.

Portland, Oregon.

FAILING-MCCALMAN COMPANY.—We can only report that business conditions are favorable in the Pacific Northwest, and everything promises that they will continue so. Our crops all look well apparently, prices will be good and a great deal of new railroad construction is promised for the present year.

In addition to this there is a great influx of new settlers coming to both Oregon and Washington. Practically all of them have money, so that they will engage in some productive line of business.

All in all, we expect that business will continue to grow better as the year goes by.

Baltimore.

CARLIN & FULTON.—The month of June has never been one of large business, but this year has undoubtedly proved an exception by comparison with last year. The improvement is shown in the two great exponents of business conditions, which are bank clearings and railroad earnings—both of which show large increases. Building operations are quite active and there is no better evidence of fundamental prosperity.

At the present time the farmers are busy with the wheat harvest and all are guessing as to what percentage of the mythical full crop will be gathered. The heavy rains this month injured very greatly the smaller fruits and thereby curtailed a large revenue which would otherwise have resulted in certain sections. There has never been so large a demand for Window Screens and Doors and Wire Cloth, the use of which is increasing every season, due no doubt to the advertising campaign carried on by the manufacturers.

We think we can all afford to be optimistic and look for a good trade during the coming season.

Boston.

BIGELOW & DOWSE COMPANY.—Following a cold and backward spring the past month has been warm and favorable to the growing crops. The heat has acted like magic and made up for all deficiencies, so that the farmers are assured of a handsome return for their labor.

The summer resorts are doing a rushing business and every one seems happy and contented. Seasonable goods demand was never better, and stocks are being depleted rapidly. The volume of business will exceed that of any June in the past four years. Prices are being well maintained and collections are good.

The past week marks the first active work on the Cape Cod Canal, which cuts the cape between Sandwich and Buzzards Bay for a distance of about 12 miles and reduces the distance about 75 miles, and avoids the perilous and oftentimes dangerous trip around the outside of the cape. This marks the beginning of the inland passage which is projected along the whole Atlantic Coast.

Commencements and class days have brought thousands of visitors to our city. The weather has been fine and well fitted for the enjoyment of the various out of door entertainments which rapidly succeed each other. New England is surely keeping well abreast of the times.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The continued rains in this section have had a depressing effect on business, but for the past few days the showers have been less frequent and already an improvement is noticeable.

The farmers are very busy with wheat harvest, and contrary to the general rule each one seems anxious to beat the other one getting his wheat on the market. One dollar and twenty-five cents per bushel is being paid for wheat, and as a pretty fair crop has been made in this section we can reasonably expect a considerable amount of money to be put in circulation in a short time. With a favorable season from now on we will make fairly good corn, cotton and other crops, thus adding to the prosperity of the farming class.

We have contended for the past 12 months that the farmers were in a more prosperous condition than ever before. We note that the report of the Commissioner of Agriculture for the State of Tennessee, Col. John Thompson, opens with the following remarks: "The farmers of our State are more prosperous, I think, than at any time for 30 or 40 years past. Crops of all kinds have been abundant and of first quality. Prices of products of the farm and of all kinds of live stock have been extremely remunerative. The panic which shocked the country a year ago and forced every other citizen to cover affected the farmer but little, and to-day his condition financially is excellent."

This very high authority confirms the position we have taken with reference to the prosperity of the farming class, and as the farming communities are the largest consumers of Hardware in the South we feel that it is only necessary to make another good crop to have absolute assurance of continued prosperity. Trade is much better in this section than it was 12 months ago.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Warm, not to say hot, days and nights are putting vitality into the corn fields and all other things which are dependent upon moisture and heat for growth, much to the joy of the farmer and all of those who are dependent upon him. While fine progress has been made in the uplands, the river bottoms have been so persistently subject to overflow this spring that it is only within the past week in certain sections that plows have been guided through the moist furrows and the tiny stalks have begun to peep above ground. Here's hoping that we will have a very late autumn to give these tardily planted crops a chance to mature.

Trade is only moderate in volume, if looked at in one way, and yet large in another, for the heavy contracts which were made some months ago are being delivered during these dull months of early summer, in order that the decks may be cleared for the action which is promised from all quarters after the crops begin to move.

Just at present the occasional firecracker or torpedo reminds us that the Fourth is approaching, that it will begin on the third this year and run to the fifth, inclusive, Sunday wedging itself in between the Saturday half-holiday and the substitute Fourth. What a boon baseball is under such a conjunction of holidays! Double headers are universally in vogue, and nobody works very hard except the man who posts the blackboard. We had nearly forgotten the ice man. After this climax of early July is passed, there is generally a laying hold of work in good earnest, and we begin to get a foretaste of the larger volume of fall orders.

It is to be hoped that before very long the sessions at Washington will adjourn, and we shall know how much the duty has been increased on collodion, for example, much to our peace of mind. The corporation tax may be agreeable to many who have the idea that corporation spells corruption—no matter of what size or in what shape. It would be an unpopular measure, we predict, in time of peace to undertake to lay a heavy tax on ordinary business, which heretofore has not been subjected to it. There would have to be some sort of distinction made between public corporations which receive special Government or State protection and those which are

formed simply for the convenience of transacting ordinary business. We are not all engaged in weighing sugar.

Prices are firm, although when large lettings are published by railroads, for example, bidding is very close and heavy. There is some slack yet to be taken up before the hawser gets good and tight.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—This market, including other jobbing centers located on the Missouri River, presents no new or particularly interesting features at the present time. Business during the month of June has been satisfactory and up to expectations.

During the coming 30 days agriculturalists will be busy in the fields, harvesting the small grains. Corn looks very well on the uplands, but in the low or flat lands too much moisture has injured the plants, as well as retarded their growth, consequently the result may show a shortage in volume of this important cereal.

The extent and value of the crops about to be harvested will be the main feature of importance, having a bearing on the future trend of traffic, and upon this will largely depend the extent of business during the autumn months.

With crops of all kinds in fair supply, coupled with the present remunerative values, a continuance of a very satisfactory volume of business is predicted and probably assured.

Philadelphia.

SUPPLIEE HARDWARE COMPANY.—The fourteenth annual convention of the National Association of Credit Men began in Philadelphia the day after our last letter to *The Iron Age* and continued during the entire week. Over 1000 persons were present, the meeting being the largest ever held by the association. Many matters of great importance were discussed. The members of the association and their ladies were entertained on a very lavish scale. This association extends all over our country—North, South, East and West—and the importance and value of its work is generally recognized.

The time of the year has now arrived when vacations are given to employees, but care should be taken that a sufficient number remain at home, so that all orders received can be properly attended to. Salesmen should have a certain amount of relaxation, but all should realize and understand that they should not be absent when customers are home and buying goods for immediate use.

The prevalence of rain and cold weather for a couple of months back has interfered with general business on many kinds of goods; but at the present time the improvement in general conditions of trade is looked upon as greater than at any time since October, 1907. Trade on many kinds of goods during the present month has largely increased, the railroads are largely increasing their orders for all their lines of goods, and the Baldwin Locomotive Works have received unusually large orders.

The general population of the United States has had a large and wonderfully sustained increase of foreigners ever since the fall of 1907, and we certainly hope that not only those here but those who have newly arrived may secure employment.

We repeat again that improved trade is largely looked for not only in our section, but all sections of the country, which we feel and hope will continue the entire year.

Collections have been very fair during the last few months.

Cleveland.

W. BINGHAM COMPANY.—The general Hardware trade in this district is looking up every day. Our sales for the first six months of 1909 are far ahead of 1908, and are very close to our sales in the good year 1907. Railroads, mines and mills are buying supplies more freely, but not in large volume as yet. We are looking for a turn in the tide in the month of July, and we believe that we will be in the high tide of prosperity before the year ends. Everything portends that the year 1910 will be a record breaker for all kinds of business in the United States.

We think we are perfectly right in advising our customers to buy freely of manufactured Hardware—that is, Locks, Latches, Knobs, Bolts, Butts and House Trimmings generally, for the stocks on hand are not very large and the consumption is growing rapidly, and at present prices we believe they are a good purchase. We ourselves are buying liberally, so that we may take care of our customers' wants in the near future—that is, if they come to us promptly before the advances which we have been looking for take place.

The Nail and Wire market is quite steady, but it is predicted by some that the price must advance at least \$2 a ton soon. Of course, every one has to take his own chances on this. We do not advise overbuying in any line of goods, but to keep stocks well assorted and liberally supplied with leading articles that are wanted for every day trade.

Orders for fall lines, such as Elbows, Stove Boards, Coal Hods, Axes, Cross Cut Saws, Butcher Knives, and other goods such as trade in the agricultural districts will be in need of this fall, have been coming in in very fair quantities, and some have already gone forward and others will go forward soon.

Continued rains and the midsummer sun are doing a lot to bring forward the hay crop, which from reports will be very large in all sections. Wheat, oats and potatoes are looking fine in this district, and the reports we get from other sections are quite encouraging.

On the whole we enter the last half of 1909 greatly encouraged as to the future, and with the passage of the tariff bill (which is promised by the middle of July, at least) our Congressmen will retire to their homes to repair their fences and the business of the country will adjust itself so that not only normal but progressive times will be in evidence in all lines.

NOTES ON PRICES.

Wire Nails.—The market continues in a satisfactory condition, with prices well maintained and a fair amount of business. New orders apparently aggregate a larger volume than usual at this season. Mills are busy shipping on orders received during May, which covered the requirements of large buyers for some time. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$1.70
Carload lots to retail merchants.....	1.75
Less than carloads to jobbers.....	1.75
Less than carloads to retail merchants.....	1.85

New York.—The last week in the month has not been productive of a very large amount of business in the local market. Wire Nails are held at \$1.90 per keg, base, in small lots at store.

Chicago.—New demand is holding up better than was expected and is still of considerable volume. Specifications against contracts are coming out freely, and the urgent demand from jobbers for prompt shipments would indicate that their stocks are moving rapidly. While it is generally believed that sooner or later prices will be again advanced, no intimation of when such action will be taken is given. Deliveries are beginning to lag a little, but not to an extent that causes serious inconvenience. The market is firm and regular and prices are being well maintained. We quote as follows: \$1.88, Chicago, in car lots to jobbers, and \$1.93 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New demand for Wire Nails is heavier than usual at this season of the year, the impression still being general in the trade that an advance in prices may be made in the near future. Most consumers and the large trade covered their requirements for some time ahead at the \$1.60 price, and are now specifying liberally against these orders, but a great many orders have been entered by the mills at the present \$1.70 price. The mills are still accepting orders only when accompanied with specifications for shipment at convenience of the mill. Indications are that the leading Wire Nail mills will operate

steadily and to full capacity through the summer months. Prices are being firmly maintained and we quote Wire Nails at \$1.70 per keg in carload and larger lots, f.o.b. Pittsburgh.

Cut Nails.—The improvement noted in the Cut Nail market includes more liberal specifications on contract orders, while an increase in the amount of new business is reported, so that demand is larger than for some time. The market is not strong and concessions of about 10 cents per keg are obtainable from the regular quotations of \$1.80, f.o.b. Pittsburgh. Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails in the Western market, but in the East this differential is not observed.

New York.—The demand in the local market is comparatively light for Cut Nails. Nails are held in small lots at store on the basis of \$1.90 per keg.

Chicago.—The volume of business in Cut Nails has increased considerably over what it was at the beginning of the month, but there is yet room for further expansion before the mills are comfortably supplied with orders. Jobbers are specifying more freely, and on new business the mills are assuming a firmer attitude respecting prices, which are subject to less shading than for some time. We quote as follows: In car lots, to jobbers, Iron Cut Nails, \$2; Steel Cut Nails, \$1.80.

Pittsburgh.—Conditions in the Cut Nail trade are steadily improving, demand being larger than for some time, and Cut Nail mills are not as willing to make concessions in prices as they were some time ago. More new orders are being placed than in some months, and specifications against contracts are coming in freely. We quote Cut Nails at the official price of \$1.80 per keg, base, f.o.b. Pittsburgh, but this price is still being shaded about 10 cents per keg.

Barb Wire.—New business is gradually decreasing in volume as the season advances, but shipments on orders placed some time since are being made by the mills. Prices are well maintained at regular quotations, which are as follows, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots.....	\$1.70	\$2.00
Retailers, carload lots.....	1.75	2.05
Retailers, less than carload lots.....	1.85	2.15

Chicago.—In spite of the fact that the season at this time is usually closed, there is still some new buying. As compared with the heavier demand which followed the reduction of prices in May it is light, but shipments against contracts are heavy and will probably continue so for several weeks. The prices established May 15 by an advance of \$2 a ton over the low point are being firmly held. We quote as follows: Jobbers, Chicago, car lots, Painted, \$1.88; Galvanized, \$2.18; to retailers, car lots, Painted, \$1.93; Galvanized, \$2.23; retailers, less than car lots, Painted, \$2.03; Galvanized, \$2.33; Staples, bright, in car lots, \$1.88; Galvanized, \$2.18; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The season is about over and very few new orders are being received by the mills, but there is still a fair amount of business on their books, taken some time ago before prices were advanced, on which the mills are making regular shipments. The market is firm and we quote Galvanized Barb Wire at \$2 and Painted at \$1.70, in carload and larger lots, f.o.b. Pittsburgh.

Plain Wire.—Conditions in the Plain Wire market are similar to those of Barb Wire. New demand is comparatively light, while shipments from mills on orders booked early in May are heavy. The market is firm and quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of \$1.50 for Plain and \$1.80 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.....	0 to 9	10	11	12	12½	13	14	15	16
Annealed.....	\$1.50	1.55	1.60	1.65	1.75	1.85	1.95	2.05	
Galvanized....	1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35	

Chicago.—New orders for immediate delivery are tapering off and the bulk of the tonnage now being en-

tered consists of specifications against contracts. The mills are fully occupied in taking care of shipments. The booking of orders covering deliveries 60 days ahead will soon begin, and while these may be entered at ruling prices for that period an advance will be asked for more extended delivery. Prices are very firm at the following quotations: Car lots, to jobbers, \$1.68, base, f.o.b. Chicago.

Pittsburgh.—While the buying season is pretty well over, more new orders are being placed with the mills than is usual this late in the year, this being largely due to the belief in the trade that prices may be advanced in the near future. Shipments against orders booked by the mills early in May, before prices were advanced, continue heavy. The market is in excellent condition, prices being firm, and we quote Plain Wire at \$1.50 and Galvanized at \$1.80, in carload and larger lots, f.o.b. Pittsburgh mills, subject to the usual terms.

Chisels and Drawing Knives.—The market for Chisels and Drawing Knives is in good condition and prices are pretty regularly maintained. At a recent meeting of the manufacturers the situation was canvassed, but no change in price resulted.

Augers and Bits.—The demand for Augers and Bits has recently been excellent and some of the manufacturers have had difficulty in supplying the goods promptly. An advance of about 10 per cent. has recently been made in the price of Boring Machine and Nut Augers, but other kinds remain as before. The market is characterized by a good tone and the manufacturers are working with a good degree of harmony.

Window Glass.—Additional Window Glass plants have closed down on account of the extremely hot weather, which has reduced the working force in a number of localities. In other plants, worn out or broken tanks have made it necessary to discontinue work. It is anticipated by some of the manufacturers that the new president of the National Window Glass Workers, the Window Glass workers' association, may endeavor to secure a higher wage scale than is at present in force. For this reason these manufacturers are desirous of accumulating all the Glass possible during the present fire. The demand from manufacturers and jobbers continues light, especially from Eastern jobbers. Prices recommended by the Eastern Window Glass Jobbers' Association, from jobbers' list, October 1, 1903, for territory east of the Mississippi are as follows: New England and Middle States, from jobbers', Single, 90 and 35 per cent.; Double, 90 and 40 per cent.; factory shipments, Single, 90 and 45 per cent.; Double, 90 and 50 per cent.; some portions of Pennsylvania are accorded discounts 5 per cent. better than other States; in the Southern States discounts vary from 90 and 25 to 90 and 40 per cent. on Single and from 90 and 30 to 90 and 45 per cent. on Double, from jobbers.

Rope.—The business coming to manufacturers continues in fair volume, with no desire on the part of purchasers to anticipate requirements to any extent. Manila Hemp has a tendency toward lower prices, owing to surplus supplies. The receipts have been far in excess of what they were up to the same date last year. The highest grade of Pure Sisal Rope shows more strength than does lower grades, or than ordinary grades of Manila Rope. The market may be represented by 8¼ to 8½ cents per pound, base, for Pure Manila of the highest grade and a corresponding quality of Sisal at 7½ to 7¾. Lower grades of Pure Manila can be purchased at ¼ cent less than the foregoing quotations. Second grade Sisal is quoted at 6½ cents and third grade at 6 cents per pound. Jute, ¼ in. and up, No. 1, is quoted at 6¼ to 6½ cents and No. 2 at 5¼ to 5½ cents.

White Lead in Oil.—The volume of business in White Lead in Oil is of fair proportions. The Pig Lead market has maintained a firm tone, with prices unchanged, and Dry White Lead consequently holds a correspondingly strong position. The strong tone of Pig Lead and Linseed Oil is more of a supporting influence to White Lead in Oil than the demand. Quotations are as follows: In 100, 250 and 500 lb. kegs, 6¼ cents per pound; in 25 and 50 lb. kegs, 7 cents per pound, with the usual advances on smaller packages.

Paris Green.—One result of the recent hot weather has been to increase the quantity of orders received by the manufacturers for Paris Green. During the preceding cold and backward season duplicate orders were in small volume. There has been no change in prices, and some manufacturers are of the opinion that there will be none this year. The schedule for Arsenic Kegs is as follows, f.o.b. New York; terms, 30 days, or 1 per cent. 10 days; if f.o.b. Chicago, add $\frac{1}{2}$ cent per pound:

	Per pound.
On orders of 10,000 lb. or over.....	17 c.
5000 or over but less than 10,000.....	17 $\frac{1}{2}$ c.
1000 or over but less than 5000.....	18 $\frac{1}{2}$ c.
500 or over but less than 1000.....	19 $\frac{1}{2}$ c.
Less than 500 lb.....	20 $\frac{1}{2}$ c.

The extras are as follows: Kegs of 100 to 175 lb., $\frac{1}{2}$ cent per pound extra; Kits, 14-28-56 lb., $1\frac{1}{2}$ cents extra; Boxes, 2 to 5 lb., paper, 2 cents extra; Boxes, 1 lb. paper, 3 cents; Boxes, $\frac{1}{2}$ lb. paper, 4 cents, and Boxes, $\frac{1}{4}$ lb. paper, 5 cents per pound extra.

Linseed Oil.—The market has been affected to some extent by Oil in second hands sold on the basis of 59 cents per gallon for Western Raw in reasonable quantities. Withdrawals on contract orders have been fair, but buying has been moderate. Some of the crushers are more disposed to meet the 59 cent price for carload orders, as buyers are indifferent to the strong statistical position of the market and are not inclined to purchase in large quantities. Local business for small lots is comparatively light. Quotations for 5 bbl. or more are as follows: State and Western Raw, 60 cents per gallon; City Raw, 61 cents per gallon, with the usual advance of 1 cent for less than 5-bbl. lots. Boiled Oil, 1 cent advance on Raw.

Spirits Turpentine.—Rapid advances in the Savannah market have taken place during the week and have been reflected in the local market. Receipts at Savannah are reported as having been light and not in proportion to the demand, so that some of last year's supplies have been put on the market at high prices. The New York price for Machine Barrels went to 47 cents, but has now declined to 46 cents. Buying at this point has been light under these conditions. The New York market is represented by the following quotations: Oil Barrels, 45 $\frac{1}{2}$ to 46 cents; Machine Made Barrels, 46 to 46 $\frac{1}{2}$ cents per gallon.

Hardware Manufacture in France.

The Ardennes Region—Economic Labor—An Industrial Center—Value of Production—Workingmen's Follies—Work at Home—American Labor Saving Machinery—Cast Iron Industry—Specialization.

THE Belgian frontier of France is as full of interest to the Hardwareman as to the historian. The world-famed "fighting line," marked by such names as Rocroi and Malplaquet, Jemmapes and Sedan—with Waterloo a short distance northward—is now marked by the scenes of a struggle for more peaceful supremacy. The factory chimneys and colliery shafts of the Northern region are continued by the ironworks of the Ardennes, and these in their turn give place to the blast furnaces and chemical works of the Lorraine frontier.

The last named district produces the ore, smelts, and generally occupies itself with the heavy metallurgical industry, and there are also many iron works in that hive of general industry, the Nord Department. In Central France, the black country around St. Etienne works much iron and steel, while Le Creusot, like Essen, supplies artillery and armor plates to prospective belligerents all the world over with commercial impartiality.

But the Ardennes region is the maid-of-all-work of the French Hardwareman; the district from which he draws those numerous metallurgical necessities of modern civilization, less impressive in bulk, but infinite in their number and variety. The characteristic of the Ardennes factories is not their individual extent of importance, but

their multiplicity and versatility. They are nearly all localized in the northeast corner of the department, which forms a spur or point jutting wedgewise into Belgian territory.

Cheap Belgian Labor.

This is not the result of mere chance. Belgian labor is as a rule cheaper than French, and the proximity of the frontier (often so close that a man can walk home after his day's work) is thus a valuable asset to the manufacturer, who profits by the French prohibitive tariff. For instance, the Vieux-Molhain iron works, the largest in the Ardennes, belong to a Belgian company, and employ 700 Belgians and only 100 French workmen. This state of things exists more or less all along the Franco-Belgian frontier, and will explain the constant jealousy and occasional faction fights between workmen of the two nationalities.

The rich iron ore deposits of the Meurthe and Moselle Department on the one hand, and the principal French coal fields on the opposite or northeastern side, assure ample supply of raw materials, while should home fuel unduly mount in price the Belgian black country—Mons and Charleroi—is just over the border, tapped by the railway along the Valley of the Meuse.

A Commercial and Political Center.

The twin towns of Mezieres-Charleville form the commercial as well as the political center of the district. In fact, certain important informal meetings, which periodically regulate the local prices of iron, are sometimes held in the railroad refreshment room at this station as a handy gathering place. Charleville itself boasts an important foundry, two nail works, a bolt factory, &c., and there are also iron works at Mezieres, but the bulk of the trade is located to the north, where the railroad runs toward Belgium.

Estimated Output.

The output of iron and Hardware for this district is estimated at about 130,000 tons per annum, representing a value of over \$4,000,000. The heavier branches, such as blast furnaces, puddling, &c., are steadily declining and leaving this region, and the department tends more and more to specialize along its own particular lines. Railroad rolling stock, for instance, is largely produced. In 1906 (when the French railroad companies were forced by the Minister of Public Works to renew their unduly obsolete passenger cars, and to bring the number of their freight cars up to a reasonable standard to cope with France's commercial requirements) 16,780 cars were turned out in one year.

The growth of the motor industry in France has also opened new lines to the enterprising Ardennes manufacturer, who shares with his colleagues of Central France the task of supplying "detached parts" to the factories of Paris and large centers. Any little decrease in the private vehicle is compensated for by the extension of the motor bus and motor cab, which are becoming daily more popular. The French artillery and the French navy also place numerous orders in the Ardennes.

Center of Wrought Iron Industry.

Nouzon, just north of Charleville, may be considered as the center of the wrought iron trade. The blacksmiths, strikers, stokers, &c., usually Frenchmen here, are paid by piece as a rule, but are guaranteed a minimum daily gain. Some labor troubles took place six or seven years ago, the point in dispute being whether the reduction of working hours (provided by the new French act) should be accompanied by a corresponding reduction in the day's wage.

The struggle was terminated by a compromise. The daily earnings of a head smith may now be taken as from \$1.80 to \$2.60; a stoker or fitter, \$1.40, while the day laborer is guaranteed a minimum of 80 cents. At present the supply of capable men seems hardly equivalent to the growing needs of the industry.

The Fool's Paradise.

This situation in certain cases leads to much extravagance and intemperance. A workman can obtain a couple of rooms with a kitchen and a little garden for \$3 a month or less, and living is proportionately inexpensive.

When in prosperous times and under these circumstances one sees skilled men making their \$5 per diem and spending the balance in drink, &c., without saving a single cent for a "rainy day," the prospect is not a pleasing one to their well wishers. However, some provident societies exist, and any friction as to wages has so far been unaccompanied by violence.

Cottage Industries.

Nail making was a very ancient industry in this district, and several works still exist, but a more modern and interesting development is the manufacture of Bolts, which dates from the construction of the railroad from Charleville to the Belgian frontier, about half a century ago. This commenced as a cottage industry, and even nowadays a large number of Bolts and Nuts are forged by men at their own homes and simply taken to the works to be tapped.

But the home Screw cutting industry, once carried on by women in the intervals of household work, is now a thing of the past. Bolts are also still occasionally made by hand in the modern factories for small orders, as in these cases the time required to mount a special machine is sometimes longer than is necessary to turn out four or five dozen Bolts.

Introduction of American Bolt Machines.

The greater part of the Ardennes Bolts and Nuts are, however, now made by machinery. An Ardennes firm recently bought the patent for an American Bolt making machine, which, it is hoped, will secure local supremacy in this line. At present French competition is chiefly with the Nord region, where Belgian workmen daily cross the frontier to work in French factories at low wages and return nightly to sup and sleep in the land where living is less expensive. In the Ardennes factories female labor is employed for tapping and worming.

The male population, active in movement and prompt in decision, furnishes first-class workmen, whose chief fault, like that of the Nouzon smiths, is reckless expenditure in times of prosperity. The hundreds of small workshops and miniature factories in this district produce that class of skillful machine repairers which is essential to the industry of Bolt making by machinery.

The largest Bolt works are at Bagny, where the American machines, above referred to, are set up; each of these produces 25,000 to 30,000 Bolts per diem. At this factory, as at some few others, a pension fund, model dwellings and other efforts to improve the present surroundings and future prospects of the workers have been organized.

Cast Iron Work.

Revin is the center of the cast iron industry. The articles produced in the Ardennes are too numerous to recapitulate, but in this town is located one of the half dozen large foundries which specially cater for the French heating trade. The Ardennes founder carefully studies the best foreign models introduced into France and promptly turns out imitations of most Stoves made abroad (as well as at home), which may have found a ready market in France. He duly bears in mind his countrymen's taste for artistic finish, and nickeling and enameling workshops and other conveniences are to be found in most of the leading factories.

Though possibly somewhat checked by the spread of central heating, this branch has been a recent field of much enterprising ingenuity. The heating engineer can hardly dispense with some form of metallic casting, and the radiators and electric heating apparatus already produced on a small scale by some of the local manufacturers of Hardware betoken that new developments may still be open to Ardennes industry in this connection.

Diversified Products.

Iron piping for gas and water mains is specialized at Aubrives. Deville produces cylinders, aluminum gear cases and steering handles for motor cars, as well as sheet iron goods, hoists and cycle parts. Machine tools and ordinary tools, Screws, Plows and Agricultural Implements, Builders' Hardware, Anchors and Chains, Pulleys—all these and a hundred other Hardware sundries are made in the Ardennes works.

Sheet iron piping for Stoves is a specialty at Revin, Fumay is famous for its foundries, while the manufacture of every metallic article for "rolling stock," from cycle parts to railroad car fittings, or for horse or motor vehicles, is especially conspicuous throughout the whole district. A hundred smaller articles, as Firearms and Screw Jacks, Flatirons, Coach Springs or Door Hinges, are omitted for the sake of brevity, sufficient having been said to illustrate the claim of the Ardennes to be the home of the Hardware manufacture in its most special and widest sense.

Tennis Court for Employees.

THE Simonds Mfg. Company, Fitchburg, Mass., has built a tennis court on land adjacent to its works, the purpose being to provide outdoor exercise for the members of the Recreation Club organized three years ago for the office and factory employees. The cost of the court was considerable, for a building had to be removed, and filling, grading and necessary special surfacing totaled no insignificant figure, but the company believes it will be an excellent investment in the increased efficiency of its force resulting from an improved physical condition. While the company has not worked out the details of the use of the tennis court, the general plan is that it shall be open for the use of any members of the Recreation Club in the morning, at noon and at night, and probably some special time will be set aside during the day when the women of the office force will have opportunity to enjoy it. An important and very necessary feature in connection with vigorous summer exercise is the bath, and the company is already equipped with showers for the benefit of employees. Those who have enjoyed the combination of strenuous effort with a cool bath and change of clothing will realize what it must mean to the employees under conditions as planned at Fitchburg.

A. H. CHAMBERLAIN, who has been for several years a member of the editorial staff of *The Iron Age*, has been appointed sales manager of the Auto Strop Safety Razor Company, 345 Fifth avenue, New York, which is taking energetic and enterprising methods in connection with the marketing of its Safety Razor, already well and favorably known to the trade. In this new position Mr. Chamberlain's familiarity with the Hardware business and his wide acquaintance will doubtless be of advantage to him. He enters on his new field with the best wishes for his success from his former associates and a host of friends. Wiebusch & Hilger, 106 Lafayette street, New York, are selling agents representing the company to the jobbing trade.

AT A MEETING of the Advisory Board of the Connecticut Hardware Association, held at the Hotel Garde, Hartford, June 23, it was decided to hold the annual summer outing of the association at Hill's New Homestead, Savin Rock, New Haven, on July 9. A shore dinner will be enjoyed and a business session held at which reports of the president and various committees will be rendered.

THE W. SMITH GRUBBER COMPANY, La Crescent, Minn., has arranged with C. K. Turner & Son, Inc., 116 Broad street, New York, to represent it in the export trade in connection with its extensive line of Stump Pullers. The essential qualifications of these machines are referred to by the company as a low down center of power, multiple power, enabling men to do more work, and simple construction.

THE CONVENTION of the Retail Hardware Association of South Carolina, Paul W. McLure, Greenwood, secretary, which it was expected to hold on July 5, 6 and 7, has been postponed until August 10, 11 and 12. The Isle of Palms will be the scene of the gathering.

THE KNIGHT & WALL COMPANY, Tampa, Fla., recently tendered a very enjoyable banquet to its employees at Smith's Dairy Kitchen in that city. The menu card was unique in the facetious manner in which the different courses were presented.



This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.

Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.

For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.

Should Retail Merchants Demand Low Prices?

Is it wise on the part of retail Hardware dealers to DEMAND that they be given prices that will enable them to meet the prices of the great retail stores of the cities?

We have received a number of interesting replies to this question. They indicate the recognition by the Hardwaremen of the country that one of their great needs is to get goods at as low prices as possible. Some of them, however, evidently doubt the wisdom of "demanding" low prices. The letters given below, as well as others on this subject, are suggestive:

FROM A COLORADO MERCHANT: While I believe that the retail Hardware dealer should be given prices which will enable him to compete with other dealers, I would reserve the "demand" as a last resort, as my experience has been that I can usually get more through a request than a demand.

FROM NEW YORK: Such a demand would be both unwise and ineffective. If a merchant wishes to obtain prices with which to compete with city trade he must shape his own methods and his own purchases in such a way as to get them. In other words, he must get into the market and find out for himself where such prices can be obtained.

He then must purchase in sufficient quantities to warrant such quotations. In many instances he will find that the city trade is not selling the same standard merchandise that he is offering and in order to compete with this competition he must therefore carry a separate and distinct line of goods. Where his business and operating field is large enough to warrant his carrying a line of these cheaper goods it will quite likely prove both practical and profitable for him to do so.

To demand any kind of recognition without something substantial behind the demand would only result in ridicule.

FROM A MINNESOTA MERCHANT: I certainly think it wise to strive to attain prices that will enable the retailer of Hardware in the country to meet prices made by the large retail stores of the city. Since the establishment of the rural routes the farmer is as well posted on what he wants and the price he should pay for an article as is the merchant who offers the article for sale. If the country retail merchant is to exist he must be placed in position to meet all kinds of competition. It is up to the manufacturer to put the country merchant in position to sell his wares at a profit, otherwise the retailer will be out of business.

FROM A MICHIGAN HARDWAREMAN: I do not think that the retail merchant, especially in the smaller towns, has any right to demand that he be given the same prices on goods as the big city dealer gets on account of the very large quantities they buy at one time, but I do think that any dealer, however small he may be, if he buys in the same quantities, should be given the same prices.

Co-operative Buying.

Our readers will recall the various letters we have printed on this subject. Most of our correspondents while disposed to welcome something in the line of co-operative buying have not found their efforts in this

direction successful. The following letters indicate, as have other correspondents, that one great difficulty in the way is the lack of harmony among the merchants who attempt to unite their orders—a difficulty which it would seem, with the development of the association idea and a fraternal feeling, might be overcome.

FROM ILLINOIS: After considerable experience in a co-operative buying association, composed of members who did not use large quantities of goods, and were not located in close proximity to each other, I am of the opinion that the plan cannot be satisfactorily carried out, because of petty jealousy between members, lack of loyalty and

Obstacles in the Way. even in isolated cases, integrity. The saving in buying co-operatively is considerable, and

if it were not that the jobbers are doing, apparently, what they can to help the retailer in the catalogue house competition, I would be favorable to continuing the effort and endeavoring to overcome the obstacles mentioned above by eliminating the undesirables. I do not think co-operative buying for the country dealers would enable them to overcome catalogue house competition, as they

Better Than Co-operative Buying. could not purchase the kinds of merchandise needed to be on the same quality level in sufficient quantities to get a low enough price. I think

the best plan to pursue is to advertise as much as the volume of your business will justify; depend upon the personality of the house to influence trade; call upon your jobber to help you meet the price, and meet it at a loss if necessary to retain the confidence of your customer, always making an effort on quality and ignoring prices. This plan has worked well with me.

FROM IOWA: I do not favor co-operative buying for many reasons. One of the principal reasons is that some of the syndicate are always giving the customer the advantage of the low price. The man that does the work gets trouble for his pains. The only successful syndicate buying is to form a company and have capital to work on. Accept all discounts and force all members to cover this promptly and maintain that extra profit to the credit of the business.

Manufacturers of White Lead Selling Direct to Consumers.

What is the opinion of the trade in regard to the policy of the White Lead manufacturers in selling to consumers so that the retailers' profit has been whittled down to almost nothing?

We have already given answers from a number of Hardwaremen in reply to this question which was propounded in these columns a few weeks ago. Some correspondents have not run up against this practice on the part of the manufacturers, but most of them refer to the question as describing a troublesome condition of things which makes the handling of White Lead unprofitable. In indicating what the trade should do under these circumstances a number of merchants intimate, sometimes in forcible language, that the selling of White Lead ought to be given up by the trade, who should turn their attention to some goods which can be handled at a profit. The following replies touch on the general subject with suggestive side remarks:

FROM IOWA: We are not in the Lead business, but understand that the retailer gets the short end of the profit, say 25 cents per 100 lb., and if one bill during the season is lost the profit is nil.

FROM NORTH DAKOTA: This is an evil which Hardware associations should correct.

FROM MINNESOTA: Retailer is powerless. The trusts are too strong and have got beyond the control of the laws of the land, so we have to obey orders.

FROM OHIO: We think and have for the last few years thought that the retailers should cease handling White Lead. They should allow manufacturers to distribute it themselves and stand their own loss and collections. The retailers' profit has been cut down so that they cannot get a real percentage on money invested.

FROM KANSAS: We do not think any manufacturer should sell direct and then expect dealers to handle their line.

Cutlery Window Display.

Mammoth Pocket Knife in Motion.

THE accompanying illustrations principally relate to the moving portion of a show window Cutlery display made by the Simmons Hardware Company, St. Louis, Mo. The upholstering of the window was in black broadcloth, and particular attention was paid to lighting effects and the general symmetrical outline and appearance of the display. Other goods shown, as indicated in the view of the window as a whole given in Fig. 1, in-

for a few seconds, and then all closed together. The blades opened and closed about four times a minute. The large blades were arranged to open out straight with the handle and the small ones perpendicularly, but they could have been opened to any desired angle by putting a stop under the lever or counterweight.

Figs. 3, 4 and 5 afford an idea of the mechanism that operated the blades. Referring to Fig. 4, D represents the shaft to which the blades were fastened, this shaft extending through the board A, resting in boxes fastened to a frame in the back. The inside blades next to the board A were mounted on a hollow shaft, with the shaft



Fig. 1.—Window Display with Mammoth Pocket Knife, Weighing 225 Lb., in Motion, as the Striking Feature.

cluded Carving Knives, Carving Sets, Carving and Butcher Knives, Scissors and Shears, ordinary and Safety Razors. The floor of the window was occupied with Pocket Cutlery, Fancy Carvers and Sets in cases, Silver Spoons, Soup Ladles and similar goods. The mov-

connected to the outside blades passed through it. On the shafts were sheaves, E, around which wound a chain fastened to the levers G, shown in Figs. 3 and 5. On the levers were counterweights, F, Fig. 5, made adjustable and held in place by set screws, the levers resting

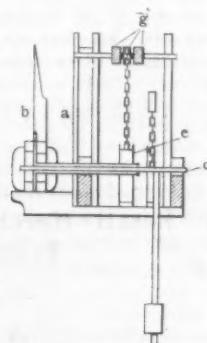


Fig. 3.—Blade, Shafts, Shears and Lever.

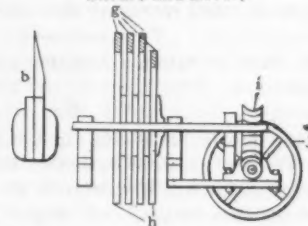


Fig. 4.—Blade, Lancers, Worm Wheel, Cams and Pulley.



Fig. 2.--The Mammoth Pocket Knife.

ing feature was supplied by a mammoth four-blade Congress pattern Pocket Knife, Fig. 2, A representing the background or board on which the Knife was mounted and which acted as a screen to conceal the machinery.

on the cams H. The counterweights were just heavy enough so that when the levers were on the low part of a cam the blade would open and the chain wind around the shear E, Fig. 3. The high parts of the cams

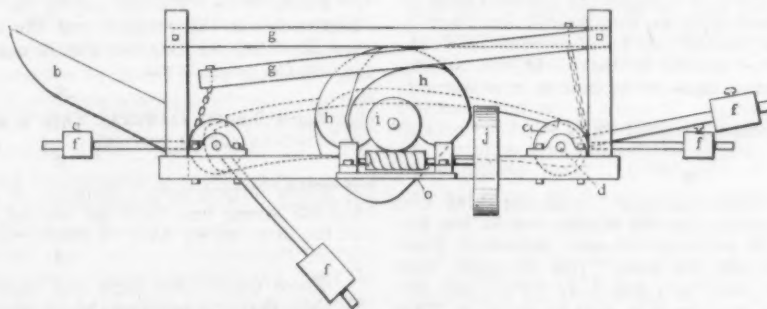


Fig. 5.—Levers, Counterweights, Cams, Worm Wheel and Pulley.

The Knife was 5 ft. long when closed and 11½ ft. when both large blades were fully extended. It weighed 225 lb. The large blades were made of solid steel and were 42 in. long, 1¾ in. thick on the back, weighing 40 lb. each. The four blades—two large and two small—opened in rotation. When all the blades were opened they remained so

coming around raised the levers, unwinding the chain from the sheave and closing all the knife blades. The cams were on a shaft, on the end of which was the worm wheel I, Figs. 4 and 5, and was driven by a screw and pulley J, which was attached to a motor by means of a belt.



A Hardware Merchant's Creed.

To respect my business, my customers, the people I buy from and myself. To be loyal, honest and fair with my customers and the people I buy from, as I expect them to be honest and fair with me. To be a man whose word carries weight, to be a booster not a knocker, a pusher not a kicker, a motor not a clog.

To base my expectations of reward on a solid foundation of service rendered my customers and the people I buy from, to be willing to pay the price of success in honest effort. To look upon my duties as opportunities to be seized with joy and made the most of and not as painful drudgery to be reluctantly endured.

To remember the future success of my business lies within myself, in my own brain, my own ambition, my own courage and determination. To expect difficulties and force my way through them, to turn hard experience into capital for future struggles.

To handle a line of goods I can believe in heart, soul and body. To carry an air of optimism into the presence of possible customers, to dispel ill temper with cheerfulness, kill doubts with strong convictions, and reduce active friction with an agreeable personality.

To make a study of the goods I sell, to know them in every detail from the ground up, to mix brains with my efforts and use system and method in my work. To find time to do everything needful by never letting time find me doing nothing. To hoard days as a miser hoards dollars, to make every hour bring me dividends in profits, increased knowledge or healthful recreation.

To transact business on a business basis, to keep my future unmortgaged with debt, to save money as well as earn it, to steer clear of dissipation and guard my health of body and peace of mind as my most precious stock in trade.

Finally, to take a good grip on the joy of life, to play the game like a gentleman, to fight against nothing so hard as my own weaknesses, and to endeavor to grow as a merchant and as a man with the passage of every day of time. **THIS IS MY CREED.**

William T. Gee.

Imagination in Business.

I believe that imagination is as valuable—I do not say as essential, but as valuable—in the management of trade as in any of the arts. It is as valuable, it is as applicable, and with the single exception of the art of literature it is as essential.

Imagination, then, is the ability, upon seeing any object, to construct around that object its probable or possible environment; thus, apprehending any force, to realize what produced it and what it will produce. The man of imagination writes a drama. His dramatic instinct apprehends the power of contrasts; he constructs a plot; he realizes what each person will do and why he will do it. His characters take possession of his will; they act out their own destiny—often against their author's own desire. He relates it all together.

Let me tell the story of two bootblacks. We can scarcely go lower in the business scale. These two boys

of about the same age I found standing one Saturday afternoon on opposite sides of a crowded thoroughfare in Springfield. So far as could be judged there was no preference between the different sides of the street, for an equally large crowd seemed to be moving on both sides.

A Tale of Two Bootblacks.

The bootblacks had no regular stand, but each had his box slung over his shoulder, and, standing on the curbstone, solicited the passers-by to stop and have a shine. Each boy had one "call," or method of solicitation, which he repeated at regular intervals. The two solicitations were entirely different, but each was composed of four words. They never varied them. Yet one of these boys, by the peculiar wording of his solicitation, secured twice as much business as the other, so far as one could judge, and I watched them for a long time.

The cry of the first boy was, "Shine your boots here." It announced the simple fact that he was prepared to shine their boots. The cry of the second boy was, "Get your Sunday shine!" It was then Saturday afternoon and the hour was 4 o'clock. This second boy employed imagination. He related one attraction to another; he joined facts together; his four simple words told all that the first boy said and a great deal more. It conveyed the information, not simply that he was there to shine shoes, but that to-morrow was Sunday; that from present appearances it was likely to be a pleasant day; that he as a bootblack realized they would need an extra good shine; and, somehow, the sentence had in it a gentle reminder that the person on whose ears it fell had heretofore overlooked the fact that the next day was the Sabbath, and that any self-respecting Christian would wish his shoes shined before he repaired to the sanctuary. Perhaps it was merely good luck that this boy secured twice the business of the other, but I have seen too many of such experiences to think of them as accidental.

Attractive Appeal.

It must be remembered always that it is not the price of an article which is important, but the reason for the price. This is one of the backbone truths of merchandising, and when once a seller gets a firm hold of this fact and is able to apply it in its highest efficiency he can almost devastate the trade. I have seen on more than one occasion the delight with which a retail advertiser first clearly grasps this idea. We can detect something of it in one of the illustrations just used; but now what is the reason which underlies this law? Is it not this: That the argument for the price is the imaginative part of the transaction; the price itself is absolutely unimaginative. Admit that the reason for the price is an important thing in the transaction, and that a high price with a good reason will sell more goods than a low price with a poor reason, and it is only reaffirming, in another form, the potentiality of the imagination in business.

Not the Price, but the Reason.

The bankrupt stock, the fire sale, the manufacturer's remnants, the annual clearance, the removal sale, the dissolution-of-partnership sale—what are these, and many more, but arguments for the price? And note this one point: that without the argument the price is powerless. Reduce your fur-lined overcoats from \$100 to \$80, and your liberal discount attracts little attention. Why? Because there is no reasonable explanation for the reduction. Why should you present overcoats to the public? But announce that, owing to an expiration of your lease and the imperative command that you vacate your present store within two weeks, you will reduce the price of your fur-lined overcoats from \$100 to \$80, and you may sell easily all you have to offer. Instinctively, the public sees the whole picture—the proprietor's anxiety, the inevitable removal, the vanishing days, the final sacrifice, and the store full of eager buyers quick to seize such an opportunity. This is only half the reduction previously considered; but one is business without imagination, and the other is business with it.—LORIN F. DELAND, in the *Atlantic Monthly*.

Examples of Cut Prices.

ARKANSAS RETAIL HARDWARE ASSOCIATION.

The Tenth Annual Convention at Fort Smith.

THE tenth annual convention of the Arkansas Retail Hardware Association was held at Fort Smith, Ark., on Tuesday, Wednesday and Thursday of last week. The headquarters were at the Hotel Main, while the business sessions and Hardware exhibition were at Tomlin Hall. The attendance was a large and representative one, and the meeting proved to be exceptionally interesting and instructive. J. P. Simpson, Malvern, former vice-president, was elected president for the ensuing year.

Liberal extracts from the annual address of President Roys and from the report of W. L. Harlan, secretary, are given on the following pages. We also reproduce substantially the practical papers on "Cream Separators as an Advantageous Line for Hardwaremen to Handle," by D. L. Harcourt, of the De Laval Cream Separator Company, Chicago, and on "Getting a Profit," by J. Bailey Gordon of the Southern Co-operative Foundry Company, Rome, Ga.

After R. P. Roys, president of the association, called the convention to order on Tuesday morning "America" was sung, followed by prayer by the Rev. F. F. Gibson. Mayor Johnson was then introduced and heartily welcomed the members to the city. Mr. Roys then presented W. H. Johnson of the Fort Smith Wagon Company, who welcomed the association on behalf of the business interests of the city. At the close of his address Mr. Johnson presented, with the compliments of his concern, a handsome gavel to the president. Responses to these addresses were made on behalf of the active members by Senator Hamp Williams, Hot Springs, and on behalf of the associate members by W. E. Wadsworth of the Racine Sattley Company, Springfield, Ill. H. T. Benham, advertising manager of E. C. Atkins & Co., Indianapolis, Ind., then read the paper on "Retail Advertising," which was given a place in our last issue.

The association was favored with the presence of Charles H. Williams, Streator, Ill., president of the National Retail Hardware Association. Mr. Williams spoke at two of the sessions, and his stimulating remarks were listened to with much attention and appreciation.

Mr. Young Wins the Grip.

Some months since, in considering the ways and means of increasing the membership of the association, it was determined to award a handsome bag to the traveling salesman securing the largest number of new members for the association. When the contest terminated it was found that the honor belonged to R. P. Young, Memphis, Tenn., and he was presented with the bag at the Thursday morning session after a felicitous address by President Roys. As a result of the contest for the grip more than 40 members were added to the association by this means.

Cost of Doing Business and the Elements That Enter Into It.

A. V. Walker of the Bracy Bros. Hardware Company, Little Rock, discussed the question of the "Cost of Doing Business and the Elements that Enter Into It" in an interesting and suggestive address. Speaking of expense in the Hardware line, Mr. Walker said that his house spent lots of money on its force of employees. It is felt that a good man always pays, and there is no hesitation in paying him a good salary. The advertising department is expensive, but if a merchant intends to do business on a wide scope it is of vital interest to him. Mr. Walker said that by the business system followed in his house expenses had been materially reduced and time and labor saved. Oftentimes, he remarked, a great many

people are disappointed after going over the year's work and finding that they have not made the amount of money they figured on getting. They had done a nice business and yet the books did not show up as well as expected. He said it was important to figure carefully the cost of doing business. Mr. Walker said that his firm had gone into business five years ago and had built up a very nice trade. It was due altogether to hard work and advertising, especially in the local papers. No use is made of circular letters, he said, because any one receiving a letter of this sort notices the 1-cent stamp and pays no attention to it. If they do start in to read it they never finish it. Mr. Walker counseled the members to advertise in their local papers and push their business energetically and persistently.

Hardware Exhibitors.

The exhibitors at the convention were as follows:

Acme White Lead & Color Works, Detroit, Mich.
Adding Typewriter Company, Little Rock, Ark.
Aluminum Cooking Utensil Company, Pittsburgh, Pa.
American Steel & Wire Company, Chicago, Ill.
Atkins, E. C., & Co., Indianapolis, Ind.
Barrett Mfg. Company, St. Louis, Mo.
Bridgeford & Co., Louisville, Ky.
Brandon & Turner, Little Rock, Ark.
Buffalo Forge Company, Buffalo, N. Y.
Chattanooga Implement & Mfg. Company, Chattanooga, Tenn.
St. George T. Cordell, Little Rock, Ark.
C. R. Cordell, Van Buren, Ark.
Dean Hardware Company, Portland, Ark.
DeLaval Separator Company, Chicago, Ill.
E. I. Du Pont de Nemours Powder Company, Wilmington, Del.
Florence Wagon Company, Florence, Ala.
Fones Bros. Hardware Company, Little Rock, Ark.
Fort Smith Refrigerator Company, Fort Smith, Ark.
Fort Smith Wagon Company, Fort Smith, Ark.
Gale-Hooper Company, Memphis, Tenn.
Galena Harrow Company, Galena, Kan.
M. Hartley Company, New York.
Harris Saddlery Company, Cairo, Ill.
T. R. James & Sons, Fort Worth, Texas.
H. W. Johns-Manville Company, St. Louis, Mo.
Kingman St. Louis Implement Company, St. Louis, Mo.
Geo. M. King Mfg. Company, Des Moines, Iowa.
Kokomo Steel & Wire Company, Kokomo, Ind.
Majestic Mfg. Company, St. Louis, Mo.
Meyer Foundry & Mfg. Company, South Bend, Ind.
Milburn Wagon Company, Memphis, Tenn.
National Lead Company, St. Louis, Mo.
Oliver Chilled Plow Works, St. Louis, Mo.
O'Shea-Hinch Hardware Company, Fort Smith, Ark.
Owosso Mfg. Company, Benton, Ark.
Peters Cartridge Company, Cincinnati, Ohio.
Post Pipe Company, Texarkana, Ark.
Racine Sattley Company, Springfield, Ill.
Rathbone & Panigot Company, Grand Rapids, Mich.
Springfield Wagon Company, Springfield, Mo.
Speer Hardware Company, Fort Smith, Ark.
Standard Mfg. Company, Shelby, Ohio.
Tucker Duck & Rubber Company, Fort Smith, Ark.
Vulcan Plow Company, Evansville, Ind.
Waters-Pierce Oil Company, Little Rock, Ark.
Warren McArthur, Chicago, Ill.

THE QUESTION BOX.

A night session was held on Tuesday evening, which was largely devoted to discussion of matters brought up through the Question Box. Among the questions thus receiving the attention of the members were the following:

What advantage is there to the retail Hardware, Implement or Vehicle merchant in selling Farm Wagons without a profit?

HAMP WILLIAMS: It is sometimes advantageous to sell a Farm Wagon without a profit. For instance, a man comes into the store and looks around. Possibly he has made up his mind what kind of a Wagon he wants, and if

he sees what he wants at the right price he will buy it. I have a letter here from a man who sold a Wagon without profit, but at the same time he sold Harness and some other articles on which he made a good profit. Doubtless if he had not succeeded in selling the Wagon he would have lost the sale of the other articles. So this man finds there is something in selling a Wagon without a profit.

MR. ROGERS: Take a man who sells Wagons without a profit and see what he does to his brother who insists on a profit. He forces his brother dealer to sell without a profit, and if the latter handles Wagons exclusively what does it do for him? If the Wagon business is a legitimate one then it should be conducted in a legitimate way, and that way is to sell at a profit. I hope this association will pledge its members to sell goods at a reasonable profit.

MR. PATTERSON: I think we ought to make a profit on Wagons. I would not sell a Wagon otherwise. I fail to see any advantage in it.

What reasons are there for a retail Hardware merchant exchanging goods or refunding money?

HAMP WILLIAMS: My method is to satisfy my customers. If a man buys an article from me and brings it back, I say, "Here's your money."

MR. WALKER: I don't like that idea, for it is mighty hard when a man buys an article and then comes in and says he wants his money back. We have gone to the expense of putting that article on the books and files, and we cannot afford to give a man a week or a month to decide whether he wants the article or not. If a man brings an article back because he does not know how to use it, let him keep it and learn how to use it.

What relation does the furniture line bear to the Hardware business?

MR. PATRICK: We have been in the Hardware and furniture business for about three years. The reason we handle furniture is because when we were not handling this line many times a young married couple came into the store to buy a Range. They would come to town with the intention of buying furniture for their home, and after investing in a Stove the next thing would be a Bedstead, and if we did not have the Bedstead they would go to some other place, and we would probably lose the sale of the Stove because we could not furnish them the bed. I think the two lines go nicely together, and if you could see the happy expressions on the faces of a young married couple when you sold them the Stove and furniture you would think that the two lines fitted in well.

MR. HARRIS: I like to see Hardware dealers handling furniture. As far as I can see they bear a close relation. We have people moving into our town who have sold out everything before coming, and when they go into a store to buy a Stove they want to buy their furniture at the same place. Another thing, we find it profitable to combine the two lines.

MR. COCHRAN: I think it is nice for the two lines to be handled together in small places. Where the towns are large enough to justify it, I think Hardware and furniture ought to be carried separately.

Is the jobber who has a retail department under the same roof a legitimate wholesaler?

HAMP WILLIAMS: If he is a jobber he should sell to the retail trade and let the retailer sell to the consumer. He should not send out for and solicit business from the consumer.

What is the most effective way to advertise the retail Hardware business?

HAMP WILLIAMS: The more we talk about this question the more we will know about it. I began six years ago to handle commercial Fertilizer, and in order to make a success of it I advertised it. I first started in with a few hundred pounds, and the next year I ordered a carload. The following year I bought two carloads, and I advertised this commodity all over the county, and talked it up with my customers; got as many of them to take 100 lb., if not more, as I could. This year I have sold 13 cars, and all due to advertising.

Before we sell a sack we open it and put in a little slip of paper, offering a premium of \$10 for the largest and best matured stalk of cotton and \$20 for the largest and best matured stalk of corn, both to be grown by our Fertilizer. I put up 2-lb. packages, and when a farmer comes in I ask him if he is using my Fertilizer, and if he says no I give him a package of it, and tell him how to distribute it by the side of a row of his cotton and how to cultivate it, and he gets interested and says he will take it and try it. Last week we gave away 40 lb., and took the names and addresses

of those receiving the packages, asking them to report to us and see if they derive any benefit from it. This fall we are going to write these parties and obtain reports from them.

I have heard merchants say that they keep their business to themselves, and do not let their competitors know what they were doing. Anybody can find out what I am doing and all about my business. When a man comes into your store ask him his name and what he wants. Tell him that you handle Mixed Paint, and write to your manufacturer and have him send literature to him. Train your clerks to interest themselves in every customer's welfare. If a man comes into my store and I am engaged at the time as soon as I get a chance I go to the clerk who waited on him, and ask him what the man wanted and get his name.

MR. COCHRAN: We don't sell Fertilizer or Mixed Paint, but I think it is a fine idea to send names of customers to manufacturers and let them write and send literature. It is a good idea when a man comes in and buys a Wagon or a Plow to put it in the paper that he bought a nice Wagon, or whatever it may be, or that Mrs. So-and-so bought a nice rug or a beautiful bed. That's a good way to advertise.

President's Address.

Increasing the Membership—State Legislation—Money in Freight Traffic Bureau—Local Clubs—Hardwareman as an Educator—Mutual Insurance.

EXTRACTS FROM THE ANNUAL ADDRESS OF R. F. ROYS, RUSSELLVILLE, ARK.

Last July, after consultation, we offered a memento to the traveling man securing the most new members during the year. This has resulted in the addition of 41 members up to this date. Getting new members is a subject your secretary and other officers have to contend with more than any other. It is like Banquo's ghost—it is always with us. In this, however, each member can render valuable aid and assistance by doing a little missionary work at home.

You will pardon me for a personal reference, but it goes to show what can be accomplished with a little effort. In my home town there are six firms that are eligible to membership. Our loyal associate members have been very active during the year with those who did not belong to the association. I myself have kept in close touch with the situation and during the last week I made it a point to visit the parties and talk with them, and as a result we have five of the firms enrolled up to June, 1910, and I think all are in attendance here, and the sixth man says he is ready to quit business.

Now, give this question of securing new members a little time, take the printed matter that your secretary can furnish you at any time, work on your neighbor, and I am satisfied you can get results and it will not only help your secretary, but will give him greater encouragement to work.

Legislation.

Your committee has placed on the statute book an act to regulate the sale of Lightning Rods, Steel Ranges, Clocks, Pumps, Buggies, Carriages and Vehicles.

We believe in letting any one sell merchandise that wants to, and we also believe in every one being taxed alike, and that is the object of the present law. We dealers have our stocks of goods on hand and are subject to the laws of the country and are taxed to maintain our form of government. Why, then, should foreign companies come into our homes and sell an article of any kind and have the benefit and protection that our laws afford and enjoy the same privileges that we do and be allowed to go without contributing a cent to the general expense.

I would suggest that whenever you find this law is being violated you immediately get positive evidence and proceed to see that the officers do their duty. Your secretary would also like to have you inform him of any occurrence of this kind.

I hope the Executive Committee will arrange a fund that



R. F. ROYS.

can be drawn upon when necessary to assist in carrying out the intents and purposes of this law.

This question of legislation is one of great importance. I think that there should be a great deal less of enactment and a great deal more of enforcement. In my opinion, our recent Legislatures have seemed to have a mania for special acts and railroad legislation. I think the business men of the State, to a great extent, are the ones that form the business policies of the State. They should take more active interest in public affairs and see to it that competent business men are sent to the Legislature, men who will give us a business administration instead of a political administration.

Freight Traffic Bureau.

This is a feature that you should encourage most heartily. Up to date it has only been advocated as an experiment. It can be made a strong feature of our association work, and will put us in the lead of any State organization. It takes time and encouragement to get this office in working order, but with a secretary qualified to handle this branch of work he can take it in connection with his routine work and make a financial success of it.

The railroad companies have already met us half way and have furnished us with all the tariffs and classifications necessary, and have placed us on their mailing list and congratulated us on the effort we are making to handle this branch of business in a systematic way. I would refer this matter to the Executive Committee and suggest that they undertake to put this Freight Bureau on a solid working basis.

Local Clubs.

I would suggest that our dealers when there are two or more of them in the same place form themselves into a local club of a social nature and meet once a month at each other's homes. Let your wives take a part in these club meetings. I believe that you will succeed in getting better acquainted with each other and be able to improve the business conditions in your respective localities. This might be a little more comprehensive and take in a whole county, instead of a town. Suppose some of you try it and let us hear how it works.

Secretary's Office and Work.

Now, a word in regard to the secretary's office. This is the heart of our organization, this is the one thing that you pay in your money to keep in existence. Don't ignore it. When your secretary sends you a letter asking for information he has an object in view and expects an answer. If you do not reply you have stopped the work of the office to that extent.

He is not prying into your personal affairs for his own satisfaction, but to sum up the total conditions as a guide, and unless he gets what he asks for he has to go ahead in a blind effort to accomplish what he is after. I can call to mind an instance when he mailed out a letter to each of about 200 members asking for certain information. He only received about six replies. Had he received as many as 40 replies it would have been the means of his saving at least \$50 for the association and a month of his time. Now this is your association, and it will be just what you make it, so let me kindly ask that in the future you take more interest in the work and we can accomplish more.

Hardware Merchants as Public Educators.

History is only repeating itself when I make the statement that it is the Hardwareman that takes the front seat when it comes to the development of the country. On his shoulders falls the duty of educating the people up to improved methods and advanced ideas. We can do a noble work for our State by studying conditions and posting ourselves on what is to the best interest of all parties concerned with the conditions that surround us.

We should agitate the subject of good roads. We have the necessity for them in this State, we have the material

Good Roads.

in the State for the making of good roads, and I believe we have the men that are capable of building them with the material and money on hand, but we have got to educate the people up to the benefits to be derived. I wish that every one of you would take particular notice of some of the good roads leading into Fort Smith and the way they are constructed. I would like to have had you with me on a recent trip I took through some of the Northern States where conditions for road building were not as good as ours, as all the material had to be shipped from a distance, but the roads were ideal. It was not a question of how much could the team pull, but "how much would the wagon carry." I think it would pay our members well to provide themselves with special literature on this subject, visit localities where good roads are being built and then talk to the people and encourage them to make an effort in this direction.

Another point we can do well in posting ourselves on is the creamery industry. There is no larger field for profitable results for the amount of money invested than this business. A small herd of good cows, say from 6 to 12 head,

will bring in a revenue of \$600 to \$1200 per year.

Creamery Business.

In the Northern and Eastern States this industry is to the farmer what the cotton is to the farmer in the South, the difference being in the fact that the dairy farmer gets his money every week or month, while the cotton farmer gets his about every 18 months.

If in a country where they have to house and feed their stock from six to eight months in the year they can make money out of it, why should we not be able to make more in this country of ours where the cow can almost take care of herself?

Within the last 30 days I was on a man's farm in Michigan who keeps 12 cows. His milk checks for the last 18 months have never been less than \$104 per month, and as high as \$138 per month. There is always a demand for first class creamery products and I feel that we can afford to spend some time in developing this business with our people.

We should begin a campaign of education on practical utility. We ourselves may not live long enough to reap the benefits, but should lay the foundations for future generations. Many of us are enjoying privileges that our forefathers laid the foundation for.

Advantage of Mutual Insurance.

The mutual insurance feature connected with Hardware association work is attracting attention not only from the Hardware trade in general but the outside world as well. It is one of the features that binds us all together with an unbreakable bond. Let me dwell for a minute on one or two important points. Mutual insurance is as safe as old line insurance, because there is only one risk in a block, and only two companies are writing policies for more than \$3000. Still there are enough companies in existence to enable you to carry \$30,000 of mutual policies.

Some of the older companies have a reserve fund that now amounts to more than four times the amount of any annual loss account they have ever had. This surplus is growing all the time, and as soon as you become a policyholder you are a stockholder and a part of this surplus is yours.

There is no "pig in the poke" about this business in any particular. You pay your regular old line premium and when your policy expires you receive credit for one-fourth in some companies and up to one-half in others of the full amount of your premium. You can apply this on another policy or get the cash for it.

Catalogue House Competition.

It occurs to me that we might possibly pursue the same methods adopted by the catalogue houses and overcome, to a great extent, the injury they are doing us. They are not afraid to spend money advertising. We may have to spend more to accomplish results.

Suppose in each town we form a club of different merchants and get out a small pamphlet of uniform size giving descriptions and prices and offering some real bargains, all to contribute to a fund to have these pamphlets bound and mailed out to every resident of the county, and repeat this once a month with a change in reading matter.

Go to your jobbers and tell them what you are doing and ask them to give you some article once a month at a cost price, and use this article for your bargain.

Bargain Pamphlet.

If you go at it in the right way you can always get what you want, and then by following this policy I believe we can coax the mail order business away from the catalogue houses and keep it at home. If we try it a year and find that it pays, we can keep it up. The catalogue house is nothing but an aggregation of stores under one roof, and their advertising manager attends to the advertising for all of the stores. If you want to get in close touch with your jobber watch carefully that little line at the top of the sheet, where he says: "2 off, ten days," and see that you get the 2, and he will see to it that you get the special bargains you want.

He is anxious to have you cut the mail order man out, and following that practice with him, he will be better able to offer you what you want. A small, well assorted stock of goods bought fresh every 30 days or oftener will do more to bring you trade than the big shipments that get more or less shopworn.

Let us stop advertising the catalogue houses by abusing them and advertise our own business with a little push, vim and energy. The one big thing that puts the retailer to a disadvantage is his lack of hustle, enterprise and up to date-ness. I think it a good plan for us to knock on ourselves a while instead of the other fellow.

Integrity and Honesty.

When we return to our homes and again take up the routine of our daily lives let us sit down and commune with ourselves and find out if we are building business on that foundation that will resist the storms of adversity and criticism. Let us take the position that nothing is too good for our trade. Let us make our business life an example of sterling integrity and strict honesty. Let us make every

statement based upon the solid rock of unquestionable truth. Then we will know that what we have done has been worth doing, and the choice of our environment shall be one of honor and praise.

Secretary's Report.

State List of Merchants—Legislation Against Peddlers—Freight Traffic Bureau Possibilities—Activity on Behalf of Good Roads—A Field for Mutual Insurance.

EXTRACTS FROM REPORT OF W. L. HARLAN, LITTLE ROCK, ARK.

Just prior to the publication of our 1909 annual programme, I submitted a list of dealers in Hardware, Implements and Vehicles of the State, as nearly as I could ascertain them. These lists were mailed to each dealer in the State, also to our associate members, asking each to revise the list and return it. Out of a total of 600 copies sent out, I received replies from 33 correcting the list. Many corrections were made and perhaps many other corrections should be made yet. If there are any corrections to be made in the list, please let me have such changes written on a piece of paper with your name signed to it. Our idea is to make the list as nearly correct as possible.



W. L. HARLAN.

Grievances.

Not many complaints have reached the secretary's office during the year. Those that were sent to me were handled promptly, and, I believe, in each instance, to the satisfaction of all parties concerned.

Legislation.

Our Legislative Committee, composed of Messrs. Williams, Pittman and Maxey, assisted by our president, have rendered this association some valuable service in the direction of securing the passage of a peddling bill through our last Legislature, and the bill is now a law. Several lawyers have given it as their opinion that if the law is attacked it will stand the Supreme Court test, and will absolutely stick. If it does, then we have accomplished a great deal. The law will undoubtedly be of much protection to the dealers throughout the State. It will absolutely drive the peddlers of Lightning Rods, Steel Ranges, Clocks, Pumps, Buggies, Carriages and other Vehicles from our borders. If any peddlers of the above articles are caught selling their goods around the country, dealers in the vicinity they are operating in should immediately make complaint to the proper authorities.

There is no doubt in my mind but that some of those concerns who make it their business to peddle the articles above mentioned will violate the law with a view of testing its constitutionality. It seems to me while we are in convention at this time that it would be well for us to provide ways and means to carry on a test case. I suggest the appointment of a special committee of three, whose duty it shall be to look into the matter very carefully and report back to this convention what, in their opinion, should be done. If in their opinion we should make a special appropriation, I think it should be done.

Freight Traffic Bureau.

It was decided by the Executive Committee of the Arkansas Retail Hardware Association in session in the city of Little Rock, Ark., last January to establish a Freight Traffic Bureau in connection with this association. The purpose of the Freight Bureau is to audit freight expense bills, enter claims for overcharges and damages and otherwise look after the traffic affairs of the members of this association, and that the association would charge to the members for such service 50 per cent. of the amount of overcharges and damages recovered from the railroads.

The organizing of a Freight Traffic Bureau requires a great deal of careful and systematic work, it takes time to assemble the necessary classifications, tariffs, supplements and back supplements, and get on the mailing list of the various railroads. I commenced to organize our Freight Traffic Bureau early in February, and have been able to make good headway, considering that I have been interrupted for the past four months attending to the issuing of our 1909 annual programme, working up the exhibition and

Members Should Support It.

making preparations for this convention. We are now in fine shape to go right ahead with the service. I have been able to get our association placed on the mailing list of several railroads leading out of Little Rock, and, as time passes along, we will, of course, be able to increase the efficiency of the bureau.

I will not attempt to tell you the value of a Freight Traffic Bureau, for it would take an hour to go into details. I believe that you all realize what it means to you to have your railroad expense bills properly revised each month; what it means to you in the way of saving in a year's time. You also realize the value of quick settlement of your claims at the hands of the railroad companies. All of these matters can be attended to in a way that will bring about a more prompt settlement if you start your papers out right.

If the members of this association will support the freight bureau, it is my firm belief that we can make it of unlimited value. It will be just what you will let it be. If the members of this association would stand together in a movement of this kind in two years we could be receiving enough outside revenue to almost support the association.

Good Roads Movement.

I notice that several aggressive, live Hardware associations send delegates to good roads conventions. It appeals to me that it would possibly be a fine thing for our association to send one or two delegates to the next good roads meeting. We all realize the value of good roads; they are many and varied. It increases the value of land. The farmers are greatly benefited by the great ease with which they can get to and from the city and a lower cost of transporting their products to the market. It means a saving to the farmer in the wear and tear on Vehicles and teams. It helps to extend the rural free delivery. It gives the dairyman and truck farmers an opportunity to get to town and market their products every day in the year. With all of this, business, of course, is on the increase all the time. In these and many other ways good roads are valuable.

Mutual Insurance.

There are several strong, reliable Hardware mutual insurance companies offering to the members of the Arkansas Retail Hardware Association something attractive in the way of insurance. In order to satisfy myself as to the amount of Hardware mutual insurance that was in effect in the State of Arkansas I recently made some careful inquiries of the different companies as to the amount of insurance that each had in force in this State among our members. The information in hand would indicate that there is at this time only \$95,000 of Hardware Mutual Insurance in force in the State. On this amount of insurance there was turned back to the policyholders in the form of rebates \$767.42. This represents only 37 policyholders. Each dealer carrying a policy is receiving anywhere from 2 to 12 times the amount of his membership fee in this association. If there are any of the members here not carrying Hardware mutual insurance, suppose you investigate the matter. Look into it carefully and consider it from purely a business standpoint.

Work of the Secretary.

Our association is growing right along and has made substantial and satisfactory gains all along the line during the year just closing. As our association grows the duties of the secretary-treasurer increase very materially. It has already reached a point in its growth whereby it seems to me that it requires the entire time of a secretary to take care of the voluminous amount of stuff coming into the office. It is no small job to keep the association's affairs moving in a way that will make the association valuable to its members all during the year. A great deal of the labor of the office is due to the publishing of the annual programme and preparing for the exhibit.

A review of the financial condition of the association will show that this association is now in a position, if it so desires, to employ a secretary for his full time.

Full Time Desirable.

The Executive Committee at its January meeting realized that it would be necessary for the association to have the entire time of the secretary in order to make the present convention a success, including the arduous, continuous labor necessary to get out an annual programme that would be a credit to our association, in order to get together an exhibit of Hardware, Implements, Vehicles, Stoves, Harness and kindred lines that would add to the interest of our convention and bring into our association a number of new members. It would also have a tendency to materially increase our attendance. The expense made possible by the action of the Executive Committee has proven the wisdom of the step taken. With a secretary working his full time during 12 months, a continuous and steady growth of the association would result.

The association should take no backward step, but should employ a secretary for his full time. In making this suggestion, I wish it to be understood that I do so for what I believe to be the good of the association. I have studied the work for more than a year and I realize much of its possibilities.

Cream Separators.

An Advantageous Line for the Hardwareman to Handle.

Money for the Farmer in Dairy Products.

BY D. L. HARCOURT, DE LAVAL CREAM SEPARATOR COMPANY, CHICAGO, ILL.

The Cream Separator is not a new article. It originated many years ago, and has now worked itself across the land, and is a source of prosperity for the farmer. It is also prosperous and successful for the Hardware dealer and puts him in the front rank, where he can stand out and put new thought in the minds of his customers. The success of the Hardware dealer depends upon the success of the farmer, therefore you should carry the things that are essential to the farmer's welfare. When a farmer comes into your store ask him how his crop is, let him know that you are interested in his work, for your hopes and your expectations are based upon the success of your farmer customers.

The soil is continually decreasing in fertility, and the farmer cannot make more than a living out of his farm, for the average crop is growing less and less each year. Now, the Hardware dealer must come to him as his advance agent with things that can produce better conditions. The farmer

Dairy Products as Farmers' Side Line.

must have something to aid him in making a living, which will not increase his expense. We know what was a luxury 25 years ago is to-day a necessity. The farmer to-day must educate his sons the same as his city brother and his daughters with accomplishments, so it is up to you to educate the farmer to take on new lines that will aid him in his earning power. The knowledge that comes to us from Nebraska, Kentucky, Mississippi and Oklahoma about dairy products is something to arrest our attention. That is what the farms of Arkansas need to-day, a side line of dairy products. A dairy cow not only produces butter fat, but she produces skimmed milk, she produces fertilizer, and without the kind of fertilizer that she produces the soil will soon be unproductive. Any common farmer easily keeps from 10 to 15 good cows, each producing from 5 to 8 lb. of butter per week, and with the average price of cream and butter we find 10 cows would yield a profit per month of \$250, besides the skimmed milk and fertilizer which she produces. If you Hardwaremen could induce your farmer customers to enter into this dairy

From Credit to Cash Basis.

business in connection with farming it would put your business on a cash basis, it would destroy the credit system, it would make farmers good financially, it would educate them, and there would be a great change in the entire country. Every dealer makes credit to the farmer, and depends upon the success of his crop. I had a man tell me his book accounts would reach \$60,000. Suppose that amount had been drawing interest at 8 per cent.—your book account does not bear interest, and all the money invested in your book credit account is to come out of your profits. How many of you would lend your brother dealer or grocery man \$25,000 without paying you interest? Unless the present conditions are changed—the depletion of the soil—the purchasing power of the farmer grows less instead of growing greater. When you give credit to Smith or Jones and he burns out or dies, where are you going to get your money? Then if he doesn't do this it keeps you watching after him to be sure of your collections. When a farmer comes in to buy a Wagon show him your Cream Separators, too, and persuade him to buy one—tell him of the advantages of a few dairy cows.

Now, all soil is composed of two classes, one mineral mold and the other vegetable mold. Phosphate and potash are placed in the soil by decaying timber. The soil is made by decaying vegetation. We are more interested in the man who tills the soil than we are in the President of the United States. If you are not interested in the farmers to that extent you will never sell them goods to an advantage. This State should be a great agricultural and manufacturing

State and you have got to stand by the man who tills the soil. Now 64 per cent. of the cow's food goes back to the soil. She brings back to it almost what she takes out; she comes nearer to doing this than anything else on earth. She will earn more money for the farmer than any one crop. Ask the farmer to put a dairy on his farm as a side line, teach him the advantage of it, find him a market for it. There is a market for dairy products just the same as for his crop. We figure that the cow will produce \$40 in butter. Then the farmer raises pigs, and the skimmed milk from one cow will feed three or four pigs and will yield about \$7.50 of fertilizer. If all farmers had a small dairy they would not make a book account in your store any more than your banker. A great many men have an idea that the Cream

Separator is not a necessity; they have never seen one demonstrated. The experiment station in Indiana claims that skimmed milk has a higher feeding power than unskimmed milk. They have found that pigs mature easier upon skimmed milk. And I say to you Hardware dealers, get the farmers interested in dairying and you will find you can handle Cream Separators to a great advantage.

Getting a Profit.

Business Location—Influencing Customers—Good Buying—Personality—Courtesy and Goods Returned.

BY J. BAILEY GORDON, SOUTHERN CO-OPERATIVE FOUNDRY COMPANY, ROME, GA.

You have asked me how to make a profit. Let us think about the place, the location. How is your city located? How is your place surrounded? Are you talking up and advertising your business or are you just sleeping on your rights? Are you exercising your best influence over your customers, making your store the center of the city? How near the front door do your clerks stand? Do you ever stop to think the greatest number of sales are made between the front door and the first 10 or 15 ft? Did you ever walk into a store and have a man meet you at the door and ask you what you want and how you are getting along and what he can show you? Your store will be just what you make it. Have you got it where it will be convenient for people to call in and see what you have got? Have you got a nice stock of goods and do you keep them in nice order? Do you expect to follow the Hardware business the rest of your life? If so, I would say, direct your attention strictly to Hardware.

Strictly Hardware.

Don't carry furniture with Hardware; let the furniture man handle the furniture and you handle the Hardware. Be honest, expect honesty and cultivate confidence. I might have said first be sober, but we have learned the lesson long ago that to do business a man must be sober. The time has come when the business man must be sober at all times and honest at all times if he expects to succeed in business.

Be a successful buyer. A man who has good judgment doesn't wait until a salesman calls to look over his stock to see what he wants to order. He knows before; he will have a list of the things he wants. If he waits until the salesman calls he is liable to over-buy or buy something he does not need. Houses send out good men to sell you goods.

It is their duty to sell you and it is your duty to buy from them. I heard a gentleman say yesterday that he considered it a compliment for a traveling man to call on him in his office. It shows that he is interested; he wants you to succeed in order to help him succeed.

What about that little postscript you send out to a man who is behind with his account, a little postscript at the bottom of the dun. You have all seen them; do you all know how they cut? Does that postscript help your collections any? If you have got a customer living out in the country who is not as prompt as you think he should be, don't send him those little sharp cuts; if you do you will lose a friend. If it is necessary to remind him of his neglect do so in a kind, courteous way.

You must never let your business push you, but you must push your business. I have in my office a stenographer and in corresponding with a man I never dictate to her the second letter. I give her the letter and ask her to answer it, for I want her own personality in that letter, because she herself feels that she is a part of that office and her position in that office depends upon that correspondence. And that is what we must all do, we must put our personality in our work. Make your clerks your best friends, your customers next and you will succeed. When a clerk comes to you and says "I want my salary raised, I want more money, I have been with you a long time and served you faithfully," ask him if he is going to make you more money next year than this. "Will you be a greater profit to me next year than you are this?" It does not matter how long a clerk has been with you; it is what he has done and what he will do for you.

Whenever a customer buys an article and brings it back and says he doesn't want it, I take it back, let him exchange it for something else, or if he doesn't want to do that I give him his money back. I do not get angry with him. I treat him just as courteously when he returns it as when he was first buying it; tell him I am sorry it displeased him, but I want to make it all right with him. Let him know I want his trade; if he doesn't buy one kind of a tool he will buy another and it pays you to make him your friend for all time. Don't be cross with him; get his confidence and strive to keep it.

When Goods Are Brought Back.

Skimmed versus Unskimmed Milk.

The Value of Show Windows.

No Better Advertising for the Hardware Man—Suggestions as to Summer Displays.

BY OBSERVER.

IN traveling from city to city it is refreshing to notice that many Hardware merchants are awakening to the full value of their show windows as advertising mediums. Still there is wide room for general improvement in this direction, and every step forward should mean increased business for the Hardware merchant who will devote time and effort to take the step.

Sporting Goods Exhibits.

Last fall there were a number of fine Sporting Goods window displays installed by Hardware merchants, who are contingently located to hunting territory. One of these windows displayed a mountain camp complete, from hut to Cooking Utensils and Ammunition, showing to the smallest detail nearly every need of the camper and hunter. Another smaller window was trimmed with trophies of the hunt and finished off with attractive cards announcing details and prices.

What better advertising can a store put out than such a display as this? The space costs the merchant the same amount whether or not he uses it to advantage. The only possible additional cost is in the time employed in trimming the window, and this can be covered many times over by the possible results in increased business.

As Applied to Summer Displays.

Why cannot the same idea be employed in displaying a Carpenter's Outfit, Garden and Lawn Requisites, Refrigerators and Oil Stoves, or any other of the numerous lines handled by the average Hardware merchant?

A lawn scene with Tent, Swing, Lawn Mower, Grass Hooks, Pruning Knives, Rakes and many other articles can be set up without much effort. This is equally true of a kitchen scene, showing Refrigerator, Oil Stove, Linoleum and many Utensils. A carpenter's outfit can be displayed by reproducing a scene in a carpenter's shop or by starting a miniature house and showing it partially completed, in either case displaying all of the many requisites of the trade.

There is no line of goods in the Hardware store which cannot be displayed with equal effectiveness. Let us have more of this kind of advertising. IT PAYS.

THE W. BINGHAM COMPANY, Cleveland, Ohio, is distributing to its customers a very conveniently arranged combined want and mail order book. It is bound in stiff covers with order sheets, duplicate order sheets and want memoranda. These follow each other in the order given throughout the book. The order sheets are perforated along the inner edges so they may be removed. The duplicate order sheets are fast, and a duplicate of the order is taken by using carbon sheet accompanying the book. On the back of most of the duplicate order sheets are illustrations and descriptions of tools.

MANUFACTURERS of Stoves, Farm Implements and Buggies will please to note that S. B. Martin, Dalton, Ohio, is not dealing in these lines, and that printed matter relating to them which he has been receiving is of no interest to him. Mr. Martin is devoting his time to the manufacture of the Wonder Barn Door Hanger, Channel Steel Track and Store Ladders.

E. C. ATKINS & Co., Indianapolis, Ind., are sending out an attractive lithograph sheet steel sign 14 in. wide by 20 in. high in the interest of their Saws. The signs are designed for display in merchants' stores, and the company will be pleased to send them gratis to those making application for them.

H. E. HILLIARY has bought the business of the Brownsville Hardware Company, Brownsville, Ore.

CONTENTS.

	PAGE.
Building an Industrial City. Illustrated.....	1
The Panama Canal.—I. Illustrated.....	6
The Cleveland Horizontal Boring Machine. Illustrated.....	11
The McGraw-Hill Book Department.....	11
An Electrically Driven Merchant Mill. Illustrated.....	12
Electrical Equipment in the Mesta Pattern Shop. Illus.....	14
A Notable Municipal Report.....	15
The Baird Double Tilting Tumbling Barrel. Illustrated.....	15
The Peerless Automatic Multi-Spindle Screw Machine. Illus.	16
The New Hill Milling Machine Dog. Illustrated.....	17
The Improved Tilted Turret Screw Machine. Illustrated...	18
A Large Brown & Sharpe Hob. Illustrated.....	20
Failures in Engineering Constructions.....	21
Operations of American Manufacturers in Canada.....	23
The Bliss Compound Pneumatic Forging Hammer. Illus....	24
New Specifications for Shapes, Plates and Rails. Illus....	26
Koppers By-Product Coke Ovens for Gary.....	29
Editorial:	
Canada's Expanding Steel Industry.....	30
The Changed Distribution of Iron and Steel Demand..	30
The Panama Canal.....	31
Correspondence.....	32
The Baltimore Contract for Fire Protection.....	33
County Bridge Lettings in Indiana.....	33
The Sault Lock Accident and the Panama Canal.....	33
Driggs-Seabury Ordnance Corporation Extensions.....	33
The Tariff Bill in the Senate.....	34
The Wm. Cramp & Sons Ship & Engine Building Company..	36
Information Wanted.....	36
Central and South American Notes.....	36
A Large Order for Erie City Boilers.....	36
The Testing Society's Meeting.....	37
The Baldwin Locomotive Works Incorporated.....	37
Personal.....	38
The Gayley Dry Air Blast in Germany.....	38
Obituary.....	38
News of the Works:	
Iron and Steel.....	39
General Machinery.....	39
Foundries.....	39
Power Plant Equipment.....	39
Fires.....	39
Bridges and Buildings.....	39
Hardware.....	39
Miscellaneous.....	39
Trade Publications.....	40
The Iron and Metal Trades:	
A Comparison of Prices.....	41
Prices of Finished Iron and Steel, f.o.b. Pittsburgh....	41
Chicago.....	42
Philadelphia.....	43
Birmingham.....	44
Cincinnati.....	44
Buffalo.....	45
Cleveland.....	45
Pittsburgh.....	46
San Francisco.....	48
New York.....	48
Metal Market.....	49
Iron and Industrial Stocks.....	50
The Western Bar Iron Association Signs Amalgamated Scale	50
The United States Cast Iron Pipe & Foundry Company....	51
The Pennsylvania Railroad Company's Wage List.....	51
The Machinery Trade:	
New York Machinery Market.....	52
Chicago Machinery Market.....	53
New England Machinery Market.....	53
Cleveland Machinery Market.....	54
Milwaukee Machinery Market.....	54
Cincinnati Machinery Market.....	55
Philadelphia Machinery Market.....	55
Government Purchases.....	56
The Puget Sound Iron & Steel Works.....	56
Hardware:	
Condition of Trade.....	57
Notes on Prices.....	60
Hardware Manufacture in France.....	62
Tennis Court for Employees.....	63
The Question Box.....	64
Cutlery Window Display. Illustrated.....	65
Making Good in Business.....	66
Arkansas Retail Hardware Association. Portrait....	67
Cream Separators.....	71
Getting a Profit.....	71
The Value of Show Windows.....	72
Price-Lists, Circulars, &c.....	73
Trade Items.....	73
Requests for Catalogues, &c.....	74
Letters from the Trade.....	74
Among the Hardware Trade.....	74
The Bumble Bee Coaster, No. 100. Illustrated.....	74
Automatic Razor Strip No. 79. Illustrated.....	75
Pocket Screwdriver Set No. 231. Illustrated.....	75
Westinghouse Electric Toaster-Stove. Illustrated.....	75
Henley Improved Roller Racing Skate. Illustrated....	76
Pullman Automatic Safety Razor Stripper. Illustrated	76
Merphisto Electrician's Bkt. No. 2403. Illustrated.....	76
Washing Machine Steel Armed Dollies. Illustrated.....	76
Bowser Wire Cloth Display Rack. Illustrated.....	77
Lawn and Tennis Court Roller. Illustrated.....	77
Westinghouse Type D A Alternating Current Motors.	
Illustrated.....	77
Stoppers for Safety Razor Blades. Illustrated.....	78
Kohler Adjustable Drain Cleaner.....	78
Improved Nasco Toe Clamp Skate. Illustrated.....	78
Current Hardware Prices.....	79

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for our Catalogue Department and for notice in this column.

JAMESTOWN METAL FURNITURE COMPANY, Jamestown, N. Y.: Catalogue of Commercial Furniture of steel construction, including Flat and Roll Top Desks, Type-writer Desks and Tables, Office Tables, Vertical Letter Files, Steel Transfer Boxes, Security Boxes, Document Files and Cases, Roller Shelf Cases, Drawer Cases, Card Desk Trays, &c.

STRONG-BATTELLE MFG. COMPANY, Bellaire, Ohio: Catalogue E relating to an extensive line of Enamel Ware, branded Emerald.

KALAMAZOO STEEL GOODS COMPANY, Kalamazoo, Mich.: Catalogue No. 10, illustrating Steel Furniture, including a variety of Stools and Chairs.

AMERICAN METAL WHEEL & AUTO COMPANY, Toledo, Ohio: Catalogue showing Coasters, Automobiles, Velocipedes, Wagons, Dump Carts, Wheelbarrows, English Doll Cabs, Tricycles, &c.

JAMES H. MATTHEWS & Co., Pittsburgh, Pa., catalogue No. 63, devoted to Rubber Stamps for business purposes, Sign Markers, Changeable Rubber Type, Stamp Racks, Automatic Numbering Machines, Dating Stamps, Checks, Check Perforators, Badges, Brass Labels, Window Letters, Burning Brands, Steel Letters and Figures, Pattern Letters and Figures and Stencils. Catalogue No. 69 relates to Marking Devices, especially for manufacturers.

MANUFACTURING EQUIPMENT & ENGINEERING COMPANY, 209 Washington street, Boston, Mass.: Catalogue illustrating Art-Steel Lockers for gymnasiums, colleges and schools, public buildings, country clubs, offices and factories; Metal Shop and Factory Equipment, Factory Stools and Chairs, Sanitary Wash Bowls in Batteries, &c.

UTICA DROP FORGE & TOOL COMPANY, Utica, N. Y.: Catalogue showing the company's full line of Nippers and Pliers, with dark blue handles and full polished heads. The tools all bear the company's trademark and are guaranteed against defects in workmanship and material.

ASPENWALL MFG. COMPANY, Jackson, Mich.: Catalogue illustrating Potato Cutters, Planters' and Sorters' hand and machine Sprayers; Potato Diggers are also made.

ACME STEEL GOODS COMPANY, 2834-2840 Archer avenue, Chicago, Ill.: Circulars showing Strap and T Hinges, Hooks, Hasps and Staples and Corrugated Fasteners. The latter are made Parallel Saw Edge, Divergent Saw Edge and Plain Parallel. The Parallel Saw Edge Fasteners are adapted to general wood working purposes and especially the box manufacturing trade. The saw edge is applied to the divergent style of Fastener, which draws edges together when the Fastener is driven, forming a tight, close joint. This style is used extensively for furniture and kindred lines. The increasing use of Corrugated Fasteners in general in woodworking industries is emphasized.

AS A STEP to further expansion of its business, the White Lily Mfg. Company, Davenport, Iowa, has lately been reorganized. The new organization is officered as follows: Sam T. White, president and general manager; Wilson McClelland, vice-president; Howard W. Power, secretary; Dick Lane, treasurer; A. F. Victor, Eastern representative. This company, which began the manufacture of Washing Machines in 1902, occupies a factory covering 30,000 sq. ft. of floor space with a daily capacity of 300 finished machines. Among its recent sales was a large order for export shipment to Australia.

THE CLAUSSE SHEAR COMPANY, Fremont, Ohio, and 25 Warren street, New York, issues a large circular showing a dozen display advertisements of Shears and Razors, electrotypes of which will be furnished to merchants gratis on application. It is explained that as the electrotypes are not solid cuts, the wording may be changed to suit the retailer's convenience.

TRADE ITEMS.

JOHN H. JARVIS AND HARRY R. W. RAHN have formed a partnership under the firm name of Jarvis & Rahn, in Philadelphia, Pa., and have been appointed selling agents of the following manufacturers: Lockwood Mfg. Company, South Norwalk, Conn.; T. C. Prouty Company, Albion, Mich.; Oscar C. Rixson Company, Chicago, Ill.; E. T. Fraim Lock Company, Lancaster, Pa., and Dearborn Hardware Company, Chicago, Ill. The firm have offices, display room and warehouse at 50 North Sixth street, where a complete and well assorted stock will be carried.

W. W. GEACH, Granville, Ohio, who has represented Hibbard, Spencer, Bartlett & Co., Chicago, in Central Ohio territory for 16 years, has purchased an interest in the Paint manufacturing business of the Dean & Barry Company, Columbus, Ohio, where he may be addressed after July 1.

HARMAN S. SALT, 114 Liberty street, New York, has been appointed representative of Mathias Klein & Sons, Chicago, Ill., manufacturer of Linemen's and Construction Tools.

THOMAS J. ROGERS, senior member of the firm of Milton Rogers & Sons Company, Omaha, Neb., died at his home, in that city, June 9, of heart disease. He was born February 27, 1858, in Council Bluffs, and was the eldest son of Milton Rogers, who went with his family to Omaha in 1861. Mr. Rogers became manager-in-chief of the pioneer store at the death of his father in 1895. He leaves a widow, two daughters and two brothers, one of whom, Herbert M. Rogers, now becomes senior member of the firm.

A WELL-PRINTED cloth bound book has just been issued containing the verbatim proceedings of the eighth annual convention of the Pennsylvania Retail Hardware Association, W. P. Lewis, Huntingdon, Pa., secretary, held at Philadelphia in February last. It also presents large portraits of the officers of the association and illustrations of some of the more conspicuous displays at the notable Hardware exposition which was held in conjunction with the convention. At the back is a list of the exhibitors and advertisers in the book, together with a classification of some of their products.

THE HENDERSON & BAIRD HARDWARE COMPANY has been organized, succeeding the Mann Hardware Company and Henderson & Baird, whose business interests have been acquired. The officers of the new company are A. Henderson, president; J. E. Mann, vice-president; T. H. Baird, manager, and J. H. Freeman secretary and treasurer. The company will handle an extensive line of General Hardware, Implements and Vehicles. Three traveling salesmen will be employed. The business of the new company will be largely wholesale, although retailing will also be carried on.

THE JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J., and 68 Reade street, New York, is giving special attention to marketing its Dixon's Stove Cement. It is offered as a simple, rapid and effective repair for cracked or worn stove, range and furnace linings. It is a dry, coarse powder, and made plastic for use by the addition of a little water. It is put up in 2½, 6 and 10 lb. packages.

PREPARATIONS are being made for the usual summer outing of the Chicago Retail Hardware Association, which will this year hold its annual picnic at Columbia Park, on the line of the Santa Fé Railroad, on Wednesday, July 28. Arrangements for the picnic, which are as yet not fully developed, are in the hands of the following committee: S. J. Koehler, chairman; W. H. Bennett, E. L. Sommers, Martin Engelhardt, Fred Ruhling and Rude Wiersig.

J. L. THAYER, JR. & Co., Mount Hope, Kan., have erected a brick building 25 x 130 ft., with cement floor, to accommodate their stock of Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting and Athletic Goods.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers catalogues, price-lists, quotations, &c.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate.

FROM WICHITA HARDWARE COMPANY, which has recently engaged in business in Wichita Falls, Texas, occupying a new building and conducting a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Paints, Oils, Sporting Goods.

FROM AMUNDSON BROS., who have opened a new store in Sunnyside, Wash., handling Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Agricultural Implements, Paints, Oils, Sporting Goods.

FROM E. D. VAUT HARDWARE COMPANY, which has recently moved into a new store at 215 Market street, San Francisco, Cal., handling Shelf Hardware, Paints, Oils and Sporting Goods. The company will make more of a specialty of high grade Mechanics' Tools.

FROM THE N. H. BENJAMIN COMPANY, Phoenixville, Pa., which handles Shelf Hardware, Paints, Oils, Window Glass, Machinists' Tools and Mill Supplies, Carriage Hardware, Farming Implements, Contractors' Supplies, Paper and Paper Bags, Fishing Tackle, Cement, Seeds, Mason Fruit Jars, &c.

FROM BROADWAY HOME SUPPLY, 217 North Broadway, Seattle, Wash., handling Shelf Hardware, Stoves, Tinware, House Furnishings, Window Glass, Agricultural Implements, Paints, Oils, Sporting Goods.

FROM SMITH & TILLBURY, who have succeeded J. W. Smith, Nooksack, Wash., handling Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Agricultural Implements, Paints, Oils, Sporting Goods, Harness, Saddlery, Pipe and Pipe Fittings.

LETTERS FROM THE TRADE.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

"Dictated, but Not Re-Read."

To the Editor: The criticisms that one of your correspondents makes in regard to the signing of letters in the absence of the one who dictated them and stamping them "Dictated by Mr. ———, and in his absence signed by ———," reminds me very much of the advent of the typewriting machines. When a large jobber sent a Kansas customer the first typewritten letter he had ever seen regarding his "valued order," the customer became extremely wrathful at what he considered an insult to his intelligence, and replied that it was not necessary to print correspondence to him, as he could read writing, &c., and that hereafter unless their correspondence be carried on as heretofore their business relations would close.

The world moves and business methods change, yet we always find a few who decry advances and do not seem to realize improved conditions and adjust themselves thereto without protests loud and long. Such people kicked when the tallow dip was supplanted by kerosene, later by gas, electricity and other methods which were considered by these "wise ones" as neither safe nor sanitary.

There are very many sound business reasons why it is not possible for those who dictate correspondence always to be present when mailing time comes, and such stamps as indicate the dictator's absence are perfectly proper and will multiply in use more and more, even if abused by some and berated by a few who have not discovered that this is an age of change and advancement.

ED. FORD.

AMONG THE HARDWARE TRADE.

The Robinson Hardware Company has removed its business from Sharptown to Laurel, Del.

The Raleigh Hardware Company, Beckley, W. Va., has been incorporated with a capital stock of \$50,000, and is doing a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods, Sash, Doors, Cement, Lime, Roofing, and all kinds of Building Materials, Harness, Buggies and Wagons. The company also gives attention to plumbing and heating.

James H. Scott has opened a new store in Hay, Wash., and carries Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods.

The Hardware firm of Waddell & Bratton, Covington, Va., has been dissolved, Mr. Bratton having sold his interest to W. E. Waddell. The latter will continue the business under his own name.

J. D. Berger, Albion, Ind., has been succeeded by Berger & Sons, handling Hardware, Stoves and Ranges, also heating and plumbing. Mr. Burger has been in the Hardware line for 35 years, all but seven years in Albion.

The Obeust Hardware Company, succeeding W. F. Obeust in Blytheville, Ark., has been incorporated with a capital stock of \$15,000. The company carries Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Paints and Oils.

The name of the Loeb Carriage & Supply Company, Montgomery, Ala., has been changed to the Loeb Hardware Company. The business continues in the same hands as heretofore. The change in name, it is believed, will be of advantage to the Hardware department, which has been growing in extent from year to year, and is now the principal part of the business. The company handles at wholesale Saddlery, Vehicles, Hardware, Blacksmiths' Supplies, Carriage and Wagon Hardware.

Howard Custard has purchased the business of Hubbard Bros., Waterville, Kan., and in connection with Shelf and Heavy Hardware, Oils, Paints, &c., handles Furniture, Harness, Queensware and gives attention to Tin work, Plumbing and Lightning Rods.

C. M. Wall has taken charge of the Hardware business in Faribault, Minn., formerly conducted by his father, S. P. Wall, who is seeking to purchase a stock elsewhere.

The Prince-Martin Hardware Company has been incorporated in Fort Morgan, Col., handling Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods.

The Kalkaska Hardware Company has purchased the stock of George E. Smith, Kalkaska, Mich.

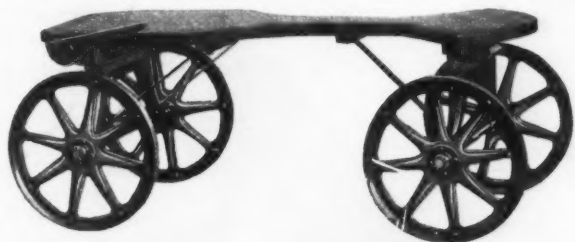
A new Hardware and Implement business will be established at Dunlap, Ia., by Fred Wettengel and W. T. McKnight under the name of the Dunlap Supply Company. Quarters have been secured for the new store, which will operate a tin shop in connection.

Floyd L. Hamilton has succeeded the Stewart Clure Hardware Company, Pullman, Wash.

The Bumble Bee Coaster, No. 100.

A new type of coaster wagon recently added to the several other styles of such vehicles made by the Wagner Mfg. Company, Cedar Falls, Ia., is shown herewith. "The peculiar shape of the top of the wagon suggested the name 'Bumble Bee,' which was accordingly adopted as a suitable designation for the coaster. The running gears

are in all respects similar to those used upon the company's regular line of coasters, but the top is so designed that the rider when coasting down an incline can comfortably rest the feet upon the front axle and steer its course in this way. It is made in several styles, with patent auto steering lever and also with tongue. The style here shown is provided with clips, to which a rope



The Bumble Bee Coaster No. 100, with Top so Shaped that Rider Can Rest Feet on Front Axle and Steer.

can be attached if desired, and all of these coasters are fitted with lever brakes. This one, styled No. 100, weighs 26 lb., and is crated, knock down for shipping in one-sixth dozen to the crate.

Automatic Razor Strop No. 79.

The U. J. Ulery Company, 25 Warren street, New York, has modified and improved its automatic razor strop, so that as now sold it will strop automatically the various razor blades, single and double edge safety, con-



Fig. 1.—Automatic Razor Strop No. 79, for Stropping Safety and Regular Razor Blades.

caved safety and the regular handled hollow ground styles. Fig. 1 illustrates the regular razor blade in process of stropping, Fig. 2 showing the end pivoted attachment for holding wafer blades, single or double, which is then slipped into the permanent holder in the frame made to hold thick back blades. The metal parts are all polished and nicked, and the strop put up in a neat leatherette case $3\frac{3}{8} \times 2\frac{1}{4}$

Fig. 2.—Attachment for Holding Single and Double Edge blades, hinged at the inner end, has two pins as a resting place for each end of the blade, thus protecting the balance of the cutting edge where it rests in the metal attachment, any possible impairment at these points being immaterial, as no cutting is done at either end.

Pocket Screwdriver Set No. 231.

The screwdriver set illustrated herewith, made by the Goodell-Pratt Company, Greenfield, Mass., is designed



Pocket Screwdriver Set No. 231, Consisting of a Hollow Brass Handle Containing Screwdriver Blades of Various Sizes and a Square Reamer.

for carrying in the pocket, and is accordingly made very light and small. It consists of a hollow brass handle, polished and nickel plated, which when closed is only

$3\frac{1}{4}$ in. long, weighing about 4 oz. In the handle are contained three screwdriver blades of various sizes and one square reamer, any of which can be quickly and firmly secured in the chuck, forming a very handy outfit.

Westinghouse Electric Toaster-Stove.

An electric stove composed of a series of metal strips in a metal frame, deriving heat through an electric lighting socket and cord, is offered by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. The stove surface

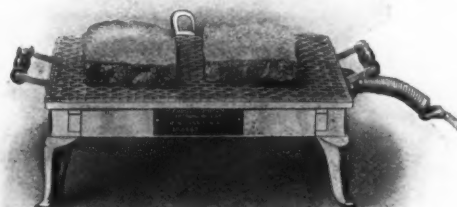


Fig. 1.—Westinghouse Electric Toaster-Stove for Preparing a Large Number of Breakfast Dishes Directly at the Table.

is $5\frac{1}{2} \times 9$ in., 4 in. high, and is equal to the preparation of the main part of a breakfast directly at the table, so that toast, eggs, coffee, griddle cakes, steak if desired, &c., may be served hot from the griddle. In Fig. 1 the stove is shown toaster in place, and in Fig. 2 with wire grid

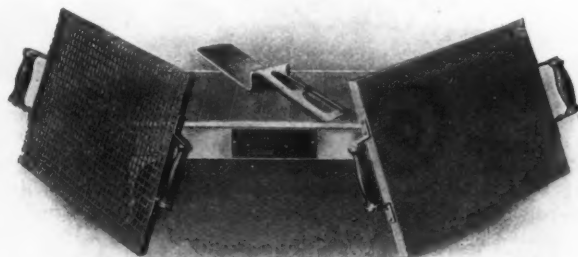
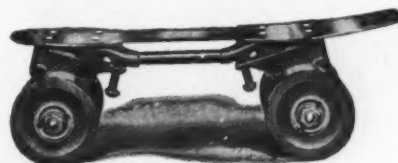


Fig. 2.—Wire Grid, Solid Metal Tray and Cake Turner for Westinghouse Electric Stove.

and metal tray, both interchangeable. The tray has a rim on the under side and inverted becomes a spider. The handle on the stove serves as a griddle cake turner. The stove is serviceable in sick room, reception room, for afternoon tea and chafing dish dainties, or wherever connection with the wiring is possible.

Henley Improved Roller Racing Skate.

The principal points claimed for the racing skate put on the market by M. C. Henley, Richmond, Ind., are that the wheels are made as large in diameter as is practical to allow the skater the greatest speed, and the wheels



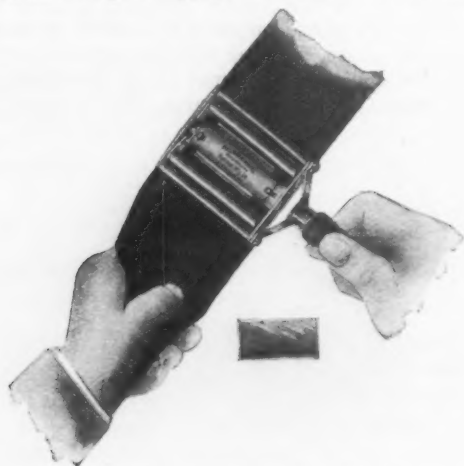
The Henley Improved Roller Racing Skate with Large Wheels, Wide Faces and Wider Trucks.

have extra wide face for better floor traction in making turns without increasing risk or lessening speed. The wheels have wide hubs and long axles to permit trucks of extra width. The bearings are made so as to eliminate needless friction on the balls. It is pointed out that the

skate is desirable for amateur or ordinary use as well as for racing purposes.

Pullman Automatic Safety Razor Stropper.

Features of the automatic safety razor stropper made by the Pullman Mfg. Company, Rochester, N. Y., include



Mephisto Electrician's Bit, No. 2403.

The W. A. Ives Mfg. Company, Wallingford, Conn., and 299 Broadway, New York, is making a new type of electrician's auger bit, No. 2403, branded Mephisto. Its distinguishing features are coarse thread, single spur, single cutter and double, but open, twist. It is designed

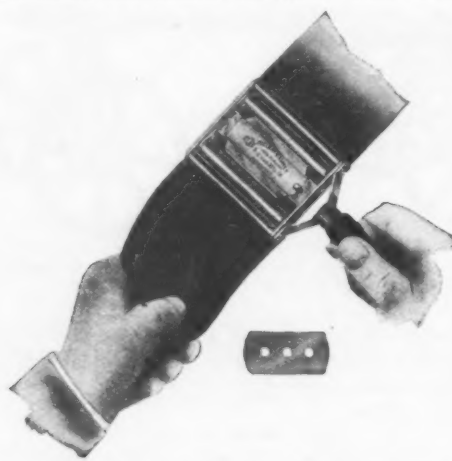


Fig. 2.—The Pullman Stropper Sharpening Single and Double Edge Blades.

sharpening single and double edge blades, as shown in Fig. 2; stropping both edges of a double edge blade without removing it and for use on any strop. Rollers on each side of the stropper are to insure perfect stropping and a keen edge, even in the hands of those inexperienced, as only a forward and backward movement is necessary.

especially for electrician's use and made in but one size—11-16 in. Among the advantages ascribed to it are that it is a self feeder and will bore approximately at double the speed of the ordinary bit. It is made of a special steel and guaranteed by the company to bore in hard or soft wood, fiber board, concrete, brick,



Mephisto Electricians' Bit No. 2403, with Coarse Thread, Single Spur, Single Cutter and Double but Open Twist.

It is explained that regardless of the pressure on the strop there is always a flat surface under the blade which keeps the angle of bevel always the same. The manufac-

plaster, &c. It is so tempered that contact with nails will not damage it, the construction of the spur and cutting lip being such that they can be sharpened repeatedly until completely worn out, the importance of which is obvious to a workman on a job away from tool chest or shop.

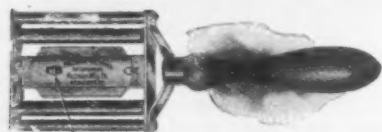
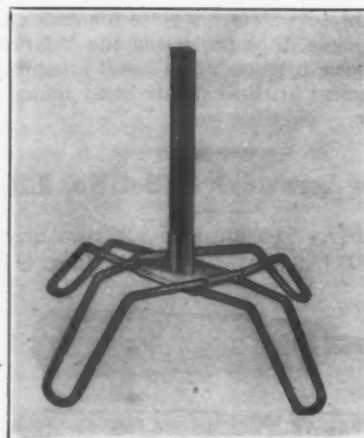
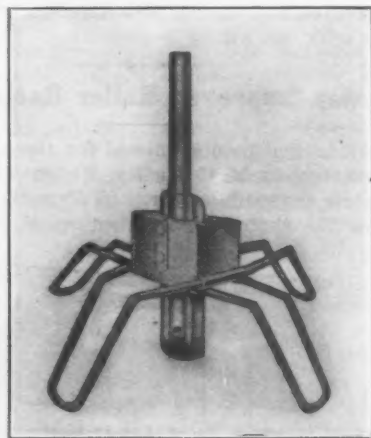


Fig. 1.—The Pullman Automatic Safety Razor Stropper for Single or Double Edge Blades.

turer offers the stropper with a guarantee that it will strop the blades of any known safety razor, single or

Washing Machine Steel Armed Dollies.

The E. L. Watrous Mfg. Company, Des Moines, Iowa, is making for the manufacturing trade washing machine dashers or dollies, the two principal styles of which are shown in the accompanying illustrations. All metal



Washing Machine Steel Armed Dollies.

double edge. The stropper will be made in five different styles, which will cover the following blades: Gillette, Gem, Jr., Ever Ready, Shrp-Shavr, Keen Kutter, Star, Gem, Crescent and Yale. The stropers are packed in individual leatherette boxes, 1 dozen boxes in carton.

parts are thoroughly hot galvanized by a new process of the company's own, which is alluded to as insuring a smooth and rustless surface, free from drops or rough places. The following are among the points of excellence claimed for the dollies: That they will not tear

the most delicate fabric; that clothes will not wrap around them and hang; that they will not crack, check or split under repeated wettings and dryings; that they will not sliver under the action of hot water; that there is an absence of pegs which might fall out; that the post being made of pressed steel can be made accurate and the wooden sleeve being of hard maple, will not shrink or swell in hot water, a very close fit being made, so that there is no room for the clothes to climb the post and get pinched between the dolly and the post; that they run light and do a proportionately larger amount of work, and that they do not float on the top of the water but go down of their own weight until they grip the whole washing, agitating the entire tub full of clothes.

Bowser Wire Cloth Display Rack.

R. M. Bowser & Son, Renfrew, Pa., have put on the market a smaller size of their Bowser wire cloth display



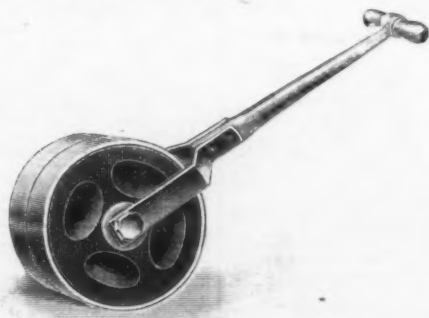
The Bowser Wire Cloth Display Rack, Holding Seven Rolls of Cloth, 24 In. Up to 36 In.

rack, holding seven rolls of wire cloth, 24 in. up to 36 in., but without rewinding device, as in the larger size. The illustration shows the wooden frame with easel back, furnished with yard stick and small crank. Opposite each roller, on one side of frame, is a card holder for card giving the width of wire cloth, with space for price. After the rolls of cloth are in place they are kept from unwinding or loosening by small rollers pressed against the

cloth by springs. These do not in any way interfere with unwinding the cloth to be cut off when making sales. The crank is designed to rewind the roll after the customer has been served. The rack is referred to as an attractive and convenient fixture which saves time and labor in the store, besides keeping the wire cloth in salable condition.

Lawn and Tennis Court Roller.

The Concrete Mfg. Company, Villa Park, N. J., is offering the roller here shown. Portland cement concrete is used to obtain necessary weight, because of its moderate cost and known lasting qualities. A protection and reinforcement of steel in combination with the cement



Lawn and Tennis Court Roller with Steel Tires or Rims and Cement Concrete Interior to Give Necessary Weight.

constitute the wheels, which have steel tires or rims with cast hubs bored for the bearing on the axle. The difference in weight of the various sizes is obtained by altering the size of the cores used in casting the rollers so that with the same set of steel tires and frame several different weights can be produced—from 300 lb. or less if desired to 450 lb., which is about as heavy as can be successfully operated by hand. It is pointed out that

with the weight put in the wheels of the roller it is easier to move over the earth than if the same weight were mounted in a weight box on a light roller. The roller is 20 in. in diameter, with 18 in. tread, and is made in two sections, so that in turning the ground is not dug up. An attachment to the handle, which is not shown in the illustration, supports the handle and prevents it from lowering to the ground.

Westinghouse Type D A Alternating Current Motors.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., is offering alternating current motors for single phase circuits with capacities from 1-20 to ¼ hp.,

volts 110 and 220, as illustrated herewith. The company states that the motors may be located in almost any place where alternating current is obtainable for electric lights, and started and stopped as simply as turning an electric light on or off. An ordinary flexible lamp cord, with a connection plug, serves to conduct the motor current for the smaller sizes from any convenient



Fig. 1.—Westinghouse Small Electric Motor.

lamp socket, and the whole device, even while operating, can be moved about the room, as, for example, in

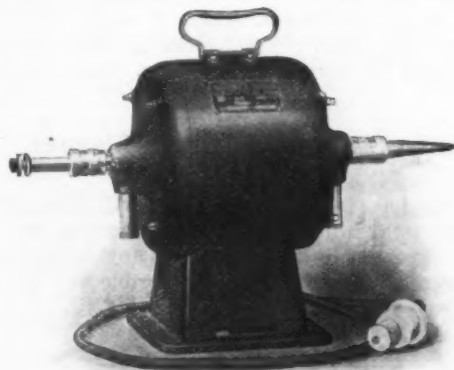


Fig. 2.—Westinghouse Buffing, Polishing and Grinding Motor

carpet cleaning. Perfect safety to the operator, to the motor and to the material being handled or work being done is assured, it is explained, all conducting parts being effectually covered, so that electric shock is practically impossible. All moving parts, except a portion of the shaft necessary for driving, are so covered and pro-

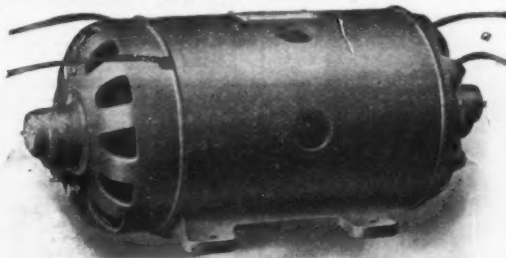


Fig. 3.—Westinghouse Generator for Charging Storage Batteries, Ringing Bells, &c.

tected that clothing or material cannot be injured. The motors are clean and free from oil throwing or dripping, so that work is not soiled. It is also mentioned that the motors are so simple that almost any one, even inexperienced persons, may operate them successfully and safely.

Stroppers for Safety Razor Blades.

The National Cutlery Company, Westmoreland and Boudinot streets, Philadelphia, Pa., is manufacturing the stroppers for safety razor blades shown herewith. The Morton style, Fig. 1, is designed for stropping Gillette blades or any safety razor blades having holes between the two edges similar to the Gillette pattern. Fig. 2 reproduces the National stropper, which is intended for

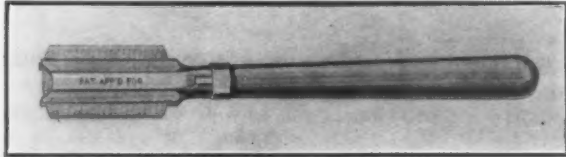


Fig. 1.—Morton Strop for Double Edge Safety Razor Blades.

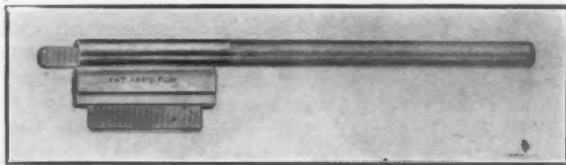


Fig. 2.—National Strop for Any and All Safety Razor Blades.

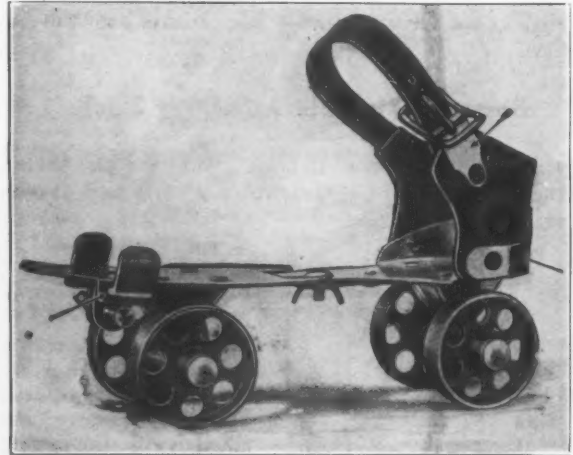
stropping any and all safety razor blades. Double edge blades are held in the Morton stropper by means of the sliding strap on the handle, which is retracted when inserting the blade and then pushed forward as shown. In the National the blades are held friction tight in a movable clamp attachment, which is easily pushed in and out at will. Both are full nickeled and fastened 12 on easel cards for counter or showcase.

Kohler Adjustable Drain Cleaner.

F. E. Kohler & Co., Canton, Ohio, will place on the market August 1 adjustable drain cleaners in six sizes of blade. These may be adjusted to any desired angle and are recommended as also serviceable for finishing tile ditches.

Improved Nasco Toe Clamp Skate.

The National Arms & Stamping Company, 430 Market street, Philadelphia, Pa., Moskowitz & Herback, Philadelphia, sole selling agents, is making roller skates with improved toe clamps, a portion of the toe plate being formed to hold the toe clamps in place. As illustrated the toe clamps move through the slotted guides. This arrangement prevents loss of clamps even when fully extended. The adjustable foot plate consists of two parts, nesting and overlapping each other. The bolt for holding foot



Improved Nasco Toe Clamp Skate for Girls, with Patented Clamp Guides and a Stamped Device Instead of Rivet to Prevent Side Movement of Foot Plate Parts.

plate after adjustment has a jam nut. An ingeniously devised stamping, integral with the foot plate, exercises the function of a rivet for engaging and guiding the nesting and overlapping parts of foot plate. A rivet might be lost; the stamping cannot. Other features are reinforced trucks, buckle clips and high heel guard. The buckle clip is of metal, to which the buckle is fastened and riveted at a strong point with the heel piece leather. This is to overcome the possibility of the buckle coming off when attached by leather. Another skate is made having a heel strap instead of a high leather back, but identical in other respects with the skate illustrated.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	per gal.
Linseed, Western, Raw.....	60 @ 61
State, Raw.....	60 @ 61
City, Raw.....	61 @ 62
Honed, 1c per gal. advance on Raw.....	75 @ 76
Raw, Calcutta, in bbls.....	38 @ 39
Lard, Prime Winter.....	57 @ 58
Extra No. 1.....	57 @ 58
No. 1.....	58 @ 59
Cotton-seed, Crude, f.o.b. mill.....	5.67 @ 5.73
Summer, Yellow, prime.....	5.60 @ 5.65
Summer, White.....	5.10 @ 5.20
Yellow, Winter.....	5.15 @ 5.20
Tallow, Acidless.....	56 @ 57
Menhaden, Brown, Strained.....	33 @ 34
Northern, Crude.....	25 @ 26
Southern.....	24 @ 25
Light Strained.....	33 @ 34
Bleached Winter.....	36 @ 37
Extra Bleached Winter.....	38 @ 39
Cocanut, Ceylon.....	74 @ 75
Cochin.....	74 @ 75
Cod, Domestic, Prime.....	38 @ 39
Newfoundland.....	40 @ 41
Red Elaine.....	43 @ 44
Saponified.....	1b 5% @ 6%
Olive, Yellow.....	1.40 @ 1.50
Neatsfoot, Prime.....	55 @ 56
Palm, Lagos.....	54 @ 55

Mineral Oils—

	per gal.
Black, 29 gravity, 25 @ 30 cold test.....	12 1/2 @ 13
29 gravity, 15 cold test.....	13 @ 13 1/2
Summer.....	12 @ 12 1/2
Cylinder, light filtered.....	29 @ 29 1/2
Dark, filtered.....	17 1/2 @ 18
Paraffine, 903-907 sp. gravity.....	14 @ 14 1/2
903 sp. gravity.....	13 @ 13 1/2
883 sp. gravity.....	10 1/2 @ 11
Red.....	13 @ 13 1/2

Miscellaneous—

	per ton
Barries:	
White, Foreign.....	\$18.50 @ 20.50
Amer., floated.....	17.00 @ 18.00
Off color.....	12.50 @ 15.00
Chalk in bulk.....	3.00 @ 3.40

	per gal.
China Clay, Imported.....	11.50 @ 18.00
Cobalt, Oxide.....	100 lb 1.45 @ 2.60
Whiting, Commercial.....	100 lb 45 @ 50
Gilders.....	100 lb 52 @ 64
Ex. Gilders.....	100 lb 56 @ 68

Putty, Commercial—

	per 100 lb
In bladders.....	\$1.70 @ 2.00
In bbls. or tubs, 100 lb.....	1.20 @ 1.45
In 1 lb to 5 lb tins.....	2.65 @ 3.25
In 12 1/2 to 50 lb tins.....	1.50 @ 1.90

Spirits Turpentine—

	per gal.
In Oil bbls.....	46 1/2 @ 47
In Machine bbls.....	47 @ 47 1/2

Glue—

	per lb
Cabinet.....	12 @ 15
Common Bone.....	7 1/2 @ 9
Extra White.....	18 @ 24
Fish, liquid, 50 gal. bbls., per gal.....	60 @ 1.20
Foot Stock, White.....	12 @ 14
Foot Stock, Brown.....	9 @ 11
German Common Hide.....	10 @ 12
German Hide.....	12 @ 18
French.....	10 @ 40
Irish.....	13 @ 16
Low Grade.....	10 @ 12
Medium White.....	14 @ 19

Gum Shellac—

	per lb
Bleached, Commercial.....	16 @ 16 1/2
Bone Dry.....	20 @ 21
Button.....	20 @ 30
Diamond I.....	26 @ 27
Fine Orange.....	15 1/2 @ 16
A. C. Garnet.....	17 @ 19
Light Orange.....	10 @ 11
Kala Button.....	26 @ 27
D. C.....	22 @ 23
Octagon B.....	22 @ 23
T. N.....	14 @ 15
V. S. O.....	24 @ 25

Colors in Oil—

	per lb
Black, Lampblack.....	12 @ 14
Blue, Chinese.....	36 @ 46
Blue, Prussian.....	32 @ 36

	per lb
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	11 @ 14
Green, Chrome.....	12 @ 16
Green, Paris.....	12 @ 24
Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Umber, Raw.....	11 @ 14
Umber, Burnt.....	11 @ 14

White and Red, Lead &c.—

	per lb
Lead, English white, in Oil, 10% @ 10%	
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs.....	6%
Dry and in Oil, 25 and 50 lb kegs.....	7
Dry and in Oil, 12 1/2 lb kegs.....	7 1/2
In Oil, 25 lb tin pails.....	7 1/2
In Oil, 12 1/2 lb tin pails.....	7 1/2
In Oil, 1, 2, 3 and 5 lb tin cans, ass't.....	8 1/2

Red Lead and Litharge:

	per lb
In 100 lb kegs.....	7
In 25 and 50 lb kegs.....	7 1/2
In 12 1/2 lb kegs.....	7 1/2
In lots of less than 500 lbs.....	7 1/2
1 1/2 c per lb advance over above prices of White and Red Lead and Litharge.	
Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry—

	per lb
American, dry.....	5 1/4 @ 5 1/2
Red Seal (French process).....	6 1/2 @ 7
Green Seal.....	7 1/4 @ 7 1/2
German Red Seal (French process).....	7 1/4 @ 7 1/2
White Seal.....	7 1/2 @ 8
French, Red Seal.....	8 1/2 @ 9
Green Seal.....	10 1/2 @ 10 1/2

Dry Colors—

	per lb
Black, Carbon.....	7 @ 10
Black Drop, American.....	3 1/2 @ 8

	per lb
Black Drop, English.....	5 @ 15
Black, Ivory.....	16 @ 20
Lamp, commercial.....	3 @ 5
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	30 @ 31
Blue, Prussian, Domestic.....	28 @ 30
Blue, Ultramarine.....	5 @ 15
Brown, Spanish.....	1 1/2 @ 1
Carmine, No. 40.....	\$2.75 @ \$2.85
Green, Chrome, ordinary.....	3 1/2 @ 5
Green, Chrome, pure.....	17 @ 25
Metallic Paint, per ton.....	\$16.50 @ \$22.00
Brown.....	\$16.50 @ \$22.00
Red.....	\$11.00 @ \$18.00
Ocher, American.....	\$12.00 @ \$15.00
American Golden.....	4 @ 5
French.....	14 @ 2
Foreign Golden.....	3 @ 4
Orange Mineral, English.....	10 @ 12
French.....	12 1/2 @ 13
German.....	12 @ 13
American.....	8 1/2 @ 10
Red, Indian, English.....	5 @ 7
American.....	3 @ 3 1/2
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$9.75 @ \$1.50
English.....	\$9.75 @ \$1.50
Sienna, Italian, Burnt and Powdered.....	3 @ 9
Italian, Raw, Powdered.....	3 @ 7
American, Raw.....	2 1/2 @ 3
American Burnt and Pow'd.....	2 1/2 @ 3
Talc, French.....	\$18.00 @ \$25.00
American.....	\$15.00 @ \$25.00
Terra Alba, French.....	\$100 lb .80 @ 1.00
English.....	\$100 lb .90 @ 1.00
American.....	\$100 lb .75 @ .80
American.....	\$100 lb No. 2, 60 @ .65
Umber, T'key, Bnt. & Pow'd.....	2 1/2 @ 3
Turkey, Raw and Powdered.....	2 1/2 @ 3
Burnt, American.....	2 @ 2 1/2
Raw, American.....	2 @ 2 1/2
Yellow Chrome, Pure.....	12 1/2 @ 13
Oxide Red, American.....	2 @ 7 1/2
Vermilion, English, Imported.....	@ 70
Chinese.....	\$0.90 @ \$1.00

Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/4 & 10% signifies that the price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/4 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price \$2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33 1/2%
North's.....10%
Upson's Patent, 1/2 doz., \$29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....10%
Ives' Stop Head Screws and Washers.....10%
Taplin's Perfection.....10%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, 1/2 doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils.....1 lb @ \$4
Hay-Budden, Wrought.....1 lb @ \$4
Trenton.....1 lb @ \$4

Imported

Swedish Solid Steel Paragon, 1 lb.....10@10 1/2
Swedish Solid Steel Sisco, Superior, 1 lb.....10@10 1/2
Wright & Sons, 1 lb, \$1 to \$10
1 lb, \$1 to 600 lb, 11 1/2¢

Anvil, Vice and Drill—

Millers Falls Co., \$18.00.....15@10

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur.....80%
Jennings' Patn., Bright.....65@66 1/2
Black Lip or Blued.....65@66 1/2
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40@45
Ford's Auger and Car Bits.....40@45
Ft. Washington Auger Co., Concord's.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, E. Jennings' list, 25¢ 1/2
No. 30, R. Jennings' list, 50¢
Russell Jennings.....25¢ 1/2
L'Hommedieu Car Bits.....15¢
Mayhew's Countersink Bits.....45¢
Pugh's Black' Pattern.....35¢
Snell's Auger Bits.....60¢
Snell's Bell Hangers' Bits.....60¢
Snell's Car Bits, 12-in. twist.....60¢
Snell's King Auger Bits.....50¢
Snell's Star Auger Bits.....50¢
Swan's.....65¢
Swan's, Jennings' Pattern.....50¢
Wright's Jennings' Bits.....50¢

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, 1/2 doz., \$26;
No. 2, \$18.....60@10
Ford's, Clark's Pattern.....60@50@10
C. E. Jennings & Co., Steel's Patn., 25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60@10
Swan's.....60%

Gimlet Bits—

Common Dbl. Cut.....\$3.00@3.25

German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz.....\$5.50@6.00

Ames.....20@10

Ship Augers and Bits—

Ship Augers.....40@10

Ford's.....35@85

C. E. Jennings & Co.:
L'Hommedieu's.....6%
Watrous'.....33 1/4 & 7 1/2¢
Snell's.....18%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhanded, Shiddered.....gro. \$3@3.66

Unhanded, Patent.....gro. \$6@70¢

Peg Awls:
Unhanded, Patent.....gro. \$1@1 1/4

Unhanded, Shiddered.....gro. \$5@70¢

Scratch Awls:
Handled, Com.....gro. \$3.50@4.00

Handled, Socket, gro. \$11.50@12.00

Elmore Tool Mfg. Co.:
Tinner's and Brad Awls.....55@7%

Scratch Awls.....60%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.

First Quality.....\$4.75@5.00

Second Quality.....\$4.25@4.50

Double Bit, base weights:

First Quality.....\$7.00@7.50

Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle.

Axles—

Iron or Steel.

Concord, Loose Collar.....\$4@4 1/2

Concord, Solid Collar.....45¢

No. 1 Common, Loose.....3 1/2@4 1/2

No. 1 1/2 Com., New Style.....4 1/4@4 1/2

No. 2 Solid Collar.....4 1/4@4 1/2

Half Patent.....70%

Nos. 7, 8, 11 and 12.....70%

Nos. 13 to 15.....70%

Nos. 15 to 18.....70¢ 10¢ 70¢ 10¢ 45¢

Nos. 19 to 22.....70¢ 10¢ 70¢ 10¢ 45¢

Boxes, Axles—

Common and Concord, not turned.....1 lb, 5¢@6¢

Common and Concord, turned, 1 lb, 6¢@7¢

Half Patent.....1 lb, 9¢@10¢

Bait—

See Fishing.

Balances—

Sash—

Caldwell new list.....50@10%

Pullman.....50@10%

Spring—

Light Spring Balances.....60@60 1/2

Chattillon's:

Light Spg. Balances.....50@50 1/2

Straight Balances.....40@40 1/2

Circular Balances.....50@10%

Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb, per lb, 2 1/4¢@2 1/2¢

Towel—

No. 10 Ideal, Nickel Plate, 1/2 doz., \$3.50

Beam, Scale—

Scale Beams.....40%

Chattillon's No. 1.....30%

Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered 1/2 doz., \$0.80;
Tinned.....\$0.85

No. 11 Wire Coppered 1/2 doz., \$1.15;
Tinned.....\$1.20

No. 10 Wire Tinned.....1/2 doz., \$1.50

Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1,
Tumbler Size, \$7.50; No. 2, Family
Size, \$24.00; No. 4, Hotel Size,
\$30.00.

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd,
\$1.85; No. 6, Jap'd, \$1.65.

Lyon, Jap'd, per doz., No. 2,
\$1.35.

Taplin Mfg. Co.:
Improved Dover, per gro., No. 60,
\$4.00; No. 75, \$4.50; No. 100, \$7.00;
No. 102, Tin'd, \$5.50; No. 150,
Hotel, \$15.00; No. 192, Hotel
Tin'd, \$17.00; No. 200, Tumbler,
\$8.50; No. 202, Tumbler Tin'd,
\$9.50; No. 300, Mammoth, per
doz., \$25.00.

Bellows—

Blacksmith, Standard List:

Split Leather.....60¢ 10¢ 65%

Grain Leather.....60¢ 80¢ 10%

Hand—

Inch.....6 7 8 9 10
Doz.....\$500 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz.....\$7.50 9.00 12.00 15.00

Bells—

Cow—

Wrought Cow Bells.....75%

Jersey.....75@10%

Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....\$4@10%

Hand—

Polished, Brass.....60@60 1/2 10%

White Metal.....60@60 1/2 10%

Nickel Plated.....50¢ 10%

Sizes.....50¢ 10%

Cone's Globe Hand Bells.....33 1/2@35%

Miscellaneous—

Farm Bells.....1 lb, 2 1/4¢@2 1/2¢

Church and School.....60@60 1/2 10%

Belting—

Leather—

First Quality, Ex. Hy., Strictly

Short Lap.....60¢ 10%

Standard.....70¢ 10¢ 70¢ 10¢ 45%

Light Double.....55¢ 10%

Cut Leather Lacing.....45¢ 50%

Leather Lacing Sides, per sq. ft., 25¢

Rubber—

Competition (Low Grade),

Nut Co.:
Standard.....70¢ 10¢ 75%

Best Grades.....60¢ 10¢ 70%

Best Grades.....40¢ 50%

Bench Stops—

See Stops, Bench

Benders and Upsetters,

Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Lang's Son & Co.'s 1908 list:

Chain, Parts, Spokes.....50%

Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks Tackle—

Common Wooden.....75¢ 75¢ 10%

B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse

Steel, 75%; Hollow Steel.....50¢ 10%

Star Wire Rope, 50%; Tarbox

Metal Snatch, 50%; Tarbox New

Style Steel, 50¢ 10%; Wire Rope

Snatch, 50%.

Lane's Patent Automatic Lock and

Junior.....30%

See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%

Embossed.....55%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Kenell & Easer Co.....33 1/4 & 10%

Bolts

Carriage, Machine, &c.—

Common Carriage (cut thread):

1/2 x 6 and smaller.....75¢ 10%

Larger and longer.....70¢ 10%

Common Carriage (rolled thread):

1/2 x 6, smaller and shorter, 75¢ 10¢ 5%

Phila. Eagle, \$3.00 list.....80¢

Boit Ends, with C. & T. Nuts, 70¢ 10%

Machine (Cut Thread):

1/2 x 4 and smaller.....75¢ 10¢ 5%

Larger and longer.....70¢ 10¢ 5%

Door and Shutter—

Cast Iron Barrel, Japanned,
Round Brass Knobs:
Inch.....3 4 5 6 8
Per doz.....\$0.30 35 45 60 80

Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10
Per doz.....\$1.20 1.50 2.25

Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz.....\$1.00 1.40 1.65

Cast Iron Flat Shutter, Jap'd,
Brass Knobs:
Inch.....6 8 10
Per doz.....\$0.75 95 1.25

Wrought Barrel Japanned,
80¢ 10¢ 80¢ 10¢ 45%

Barrel Bronzed.....60¢ 10%

Spring.....70¢ 10¢ 70¢ 10¢ 10%

Shutter.....50¢ 55¢ 50¢ 10¢ 45%

Square Neck.....75¢ 75¢ 10%

Square.....70¢ 10¢ 10¢ 80%

Ives' Mortise.....10%

Ives' Wrought Metal.....10%

Expansion—

F. H. Evans' Crescent.....40@60%

Richards Mfg. Co.....55@10%

Star Expansion Bolt Co.:
Star, Lag Screw Type.....60¢ 10¢ 5¢ 2 1/4%

Star, Wood Screw Type.....40%

Star, Machine, Single Wedge.....60@10%

Star, Machine, Double Wedge.....60@10%

Steward & Romain Mfg. Co.:
Style No. 13, Double.....60@10%

Style No. 1, Single.....60@10%

Style No. 100, Dbl. Jaw, Single.....55%

Lag Screw.....66%

Plow and Stove—

Plow.....65¢ 5¢ 70%

Stove.....85¢ 85¢ 45%

Tire—

Common Iron.....80%

Norway Iron.....80%

American Screw Co.:
Norway Phila., list Oct. 18, '84.....30%

Eagle Phila., list Oct. 18, '84.....32 1/2%

Bay State, list Dec. 28, '90.....80%

Franklin Moore Co.:
Norway Phila., list Oct. 18, '84.....80%

Cages, Bird—

Hendryx Brass: Series 3000, 5000,
1100, net list; 1200, 15%; 200, 300,
400.....30%
Hendryx Bronze: Series 700, 800.....30%
Hendryx Enamelled.....35%

Calipers—See Compasses.

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb.....\$3.50 @ \$3.85
Sharp, 1 prong, per 100 lb.....\$4.00 @ \$4.35

Burke's, 1 pr. Blunt Toe, 3/4" x 1/2" x 1/2"
Blunt Toe, 1/4" x 1/2" x 1/2"
Heel, 1/4" x 1/2" x 1/2"
Lautier, Blunt, 1/4" x 1/2" x 1/2"
Perkins, Blunt, 1/4" x 1/2" x 1/2"
1.15¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B.....52¢ @ 55¢
G. D.....per M. \$1.40 @ 55¢
F. L.....per M. \$1.40 @ 55¢
G. E.....per M. \$1.40 @ 55¢
Musket.....per M. \$1.40 @ 55¢

Primers—

Berdan Primers, 2 per M. 20¢ @ 55¢
Primer Shells and Bullets, 15¢ @ 10¢
All other primers per M. \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50.....10¢ @ 55¢
38 C. F., \$7.00.....10¢ @ 55¢
22 cal. Rim, \$1.50.....10¢ @ 55¢
32 cal. Rim, \$2.75.....10¢ @ 55¢
B. B. Caps, Con. Ball, S&W \$1.00
B. B. Caps, Round Ball.....\$1.19
Central Fire.....25¢
Target and Sporting Rifle, 15¢ @ 55¢
Primed Shells and Bullets, 15¢ @ 10¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 55¢

Casters—

Red.....65¢ @ 70¢
Plate.....60¢ @ 65¢
Philadelphia.....70¢ @ 75¢
Acme, Ball Bearing.....35¢
Gem (Roller Bearing) 10¢ @ 10¢
Steel Gem (Roller Bearing).....70¢
Standard Ball Bearing.....45¢
Yale (Double Wheel) low list.....40¢ @ 10¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3-16 1/4 5-16 3/4 3-10 3.00
7-15 4-80 3-85 3-25 3-10 3.00
3-16 1/4 1 1/16 to 1 1/4 inch.
\$2.90 3.00
German Coil.....70¢ @ 55¢
German Pattern Coil:
6-0 to 1.....70¢ @ 10¢ @ 55¢
2 and 3.....60¢ @ 10¢ @ 55¢
4, 5 and 6.....50¢ @ 10¢ @ 55¢ @ 55¢

Halter—

Halter Chains.....60¢ @ 60¢ @ 10¢
German Pattern Halter Chains,
list July 24, '97.....70¢ @ 55¢
Covert Mfg. Co.:
Halter.....35¢ @ 55¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6-3, Straight, with ring \$26.00
6 1/2-6-2, Straight, with ring \$27.00
6 1/2-8-2, Straight, with ring \$30.00
6 1/2-10-2, Straight, with ring \$35.00
NOTE—Add 2¢ per pair for Hooks
Twist Traces: add per pair for Nos. 2
and 3, 2¢; No. 1, 3¢; No. 4, 4¢ to price of
Straight Link.
Eastern Standard Traces, Wag-
on Chain, &c.....70¢ @ 10¢ @ 55¢

Miscellaneous—

Jack Chain:
Iron.....60¢ @ 10¢ @ 55¢ @ 60¢ @ 10¢ @ 55¢
Brass.....65¢
Safety and Plumbers' Chain.....75¢
Gal. Pump Chain.....1/2" @ 55¢
Bridgeport Chain Co.:
Triumph Halter and.....35¢ @ 10¢ @ 55¢
Triumph Dog.....40¢ @ 10¢ @ 55¢
Brown Halter and Coil.....50¢ @ 55¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40¢
Oneida Community:
American Halter, Dog and Kennel
Chains.....35¢ @ 10¢ @ 55¢
Ningara Dog Leads and Kennel
Chains.....45¢ @ 50¢ @ 55¢
Wire Goods Co.:
Dog Chain.....70¢
Universal Dbl. Jointed Chain.....70¢

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60¢
Pullman:
Bronze Chain, 60%; Steel Chain,
Coppered.....60¢ @ 10¢
Sash Chain Attachments, per set, 5¢
Aluminum Sash Ribbon, per 100
ft.....\$2.00 @ 55¢
Sash Ribbon Attachments, per set, 8¢

Chalk—

Carpenters' Blue.....gro. 50¢ @ 55¢
Carpenters' Red.....gro. 50¢ @ 55¢
Carpenters' White.....gro. 40¢ @ 55¢

Checks, Door—

Bardley's.....45¢
Pullman, per gro.....\$5.40
Russwin.....35¢ @ 55¢

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55¢
Youths' Chests, with Tools.....40¢
Gentlemen's Chests, with Tools.....30¢
Farmers', Carpenters, etc., Chests,
with Tools.....20¢
Machinists' and Pipe Fitters'
Chests, Empty.....15¢
Tool Cabinets.....45¢
C. E. Jennings & Co.'s Machinists'
Tool Chests.....75¢

Chisels—

Socket Framing and Firmer
Standard List.....80¢ @ 10¢ @ 80¢ @ 10¢ @ 10¢
Buck Bros.....30¢
C. E. Jennings & Co.:
Socket Firmer No. 13.....25¢ @ 75¢
Socket Framing No. 13.....25¢ @ 75¢
Swan's.....65¢ @ 70¢
L. & I. J. White & Co.:
Tanged.....30¢ @ 30¢ @ 55¢

Tanged—

Tanged Firmers.....30¢ @ 55¢
Buck Bros.....30¢
C. E. Jennings & Co. Nos. 191, 181, 253
L. & I. J. White Co.....25¢ @ 55¢

Cold—

Cold Chisels, good quality, 15¢ @ 15¢
Cold Chisels, fair quality, 11¢ @ 12¢
Cold Chisels, ordinary.....9¢ @ 10¢
Elmore Tool Mfg. Co.:
Cold Chisels.....50¢ @ 55¢

Chucks—

Almond Drill Chucks.....35¢
Almond Turret Six-Tool Chuck.....40¢
Beach Pat. each \$8.00.....35¢ @ 55¢
Blacksmiths
Cincinnati Chuck Co.:
Independent 4-Jaw Reversible.....35¢
Empire.....25¢
Jacobs' Drill Chucks.....35¢
Morrow Ball Bearing Drill Chucks.....35¢
Pratt's Positive Drive.....25¢
Skinner Lathe Chucks:
Independent.....35¢
Universal, Reversible Jaws.....35¢
Universal, Com. Style Jaws.....40¢
Combination, Reversible Jaws.....35¢
Combination, Com. Style Jaws.....40¢
Round Body or Box Body, 2 Chuck
Jaws.....25¢
Geared Scroll Chucks.....25¢

Drill Chucks:
New Model, 25%; Geared Pat-
tern, 25%; Skinner Patent, 25%
Positive Drive.....40¢
Planer Chucks.....20¢
Standard.....45¢
Drill Press Vises.....30¢
Face Plate Jaws.....35¢
Standard Tool Chuck.....45¢
Improved Drill Chuck.....45¢
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35¢
Scroll Combinations, Nos. 83 and
81.....35¢
Geared Scroll, Nos. 33, 34 and 35.....35¢
Independent Iron, Nos. 13 and 313.....35¢
Independent Steel, No. 61.....25¢
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104.....35¢
Union Czar Drill.....25¢
Universal, 11, 12, 16, 17, 13, 14, 15, 40%
Universal No. 42.....35¢
Iron Face Plate Jaws, Nos. 28, 30,
48 and 50.....35¢
Steel Face Plate Jaws, Nos. 70 and
72.....30¢

Westcott Patent Chucks:
Lathe Chucks.....50¢
Little Giant Auxiliary Drill.....50¢
Little Giant Double Grip Drill.....50¢
Little Giant Drill, Improved.....50¢
Oneida Drill.....50¢
Scroll Combination Lathe.....50¢
Whitaker Mfg. Co.:
National Drill.....25¢

Clamps—
Carriage Makers', Star, P. S. & W.
Co.....50¢
Besly, Parallel.....35¢ @ 10¢
Hammer & Co.:
Adjustable.....20¢ @ 55¢
Carriage Makers' H. P. Screw.....40¢ @ 55¢
Myers' Hay Rack.....50¢
Lineman's Swedish Neverturn.....50¢
Saw Clamps, see Vises, Saw Filer.

Cleaners, Drain,
Iwan's Champion, Adjustable.....50¢
Iwan's Champion, Stationary.....40¢
Sidewalk—
American Fork & Hoe Co.:
Shank, 1/2 doz., Socket, \$4.00;
Shank, 1/2 doz., X 7/8, \$3.50; Shank,
X 8.....\$3.75

Cleavers, Butchers—
Foster Bros.....30¢
Payette R. Phmb.....30¢
L. & I. J. White Co.....30¢

Clippers, Horse and Sheep—
Chicago Flexible Shaft Co.:
1902 Chicago Horse, each.....\$10.75
20th Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear Ball
Bearing Horse, each.....\$7.50
Stewart's New Model Sheep
Shearing Machine, each.....\$12.75
Stewart Enclosed Gear Shear-
ing Machine, No. 8, each.....\$9.75

Clips, Axle—
Regular Styles.....80¢ @ 80¢ @ 10¢
Cloth and Netting, wire
—See Wire, &c.

Cocks, Brass—
Hardware list:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....75¢
Compression Bibbs.....70¢

Coffee Mills—
See Mills, Coffee.
Collars, Dog—
Nickel Chain, Walter B. Stevens &
Son's list.....40¢
Leather, Walter B. Stevens & Son
list.....40¢

Compasses, Dividers, &c.

Ordinary Goods.....75¢ @ 75¢ @ 55¢

Conductor Pipe—

L. C. L. to Dealers:
Gal. Steel, Charcoal, Copper.

Northeastern:
70¢ @ 10¢ @ 50¢ @ 10¢ @ 50¢ @ 10¢
Eastern:
75¢ @ 10¢ @ 50¢ @ 10¢ @ 50¢ @ 10¢
Central:
75¢ @ 10¢ @ 60% 50¢ @ 10%
Northwestern:
75¢ @ 10¢ @ 60% 50¢ @ 10%
Western:
70¢ @ 10¢ @ 50¢ @ 12 1/2% 50¢ @ 5%
Tennessee:
70¢ @ 10¢ @ 50¢ @ 12 1/2% 50¢ @ 5%
Southern:
70¢ @ 10¢ @ 50¢ @ 12 1/2% 50¢ @ 5%
Southwestern:
70¢ @ 10¢ @ 50¢ @ 5% 50¢ @ 5%

Terms, 60 days: 2% cash 10 days. Fac-
tory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Gal.....2 3 4 6 8
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, Lined, side handles,
Gal.....2 3 4 6 8
Each.....\$1.85 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled.....10%
Agate Lined.....10%

Coppers' Tools—

See Tools, Coppers'.

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair
and heavier, 21¢ @ 55¢; lighter
than 3 lb. to pair.....23¢ @ 55¢

Cord—

Sash.....lb. 35¢

Braided, Drab.....lb. 35¢

Braided, White, Com. Nos. 8
to 12, 22¢ @ 55¢; No. 7, 23¢; No.
6, 24¢. In lots of 12 doz. or
over, 1 cent less per pound.

Cable Laid Italian, lb., No. 18, 37¢
Italian, lb., No. 18, 25¢; B. 22¢
Common India.....lb. 11¢ @ 11¢ @ 55¢
Cotton Sash Cord, Twisted, 18¢ @ 20¢
Patent Russia.....lb. 20¢
Cable Laid Russia.....lb. 21¢
India Hemp, Br'd'd.....lb. 21¢
India Hemp, Twisted.....lb. 13¢ @ 11¢
Patent India, Twisted.....lb. 17¢
Pearl Braided, cotton, No. 6, 1/2 lb.,
20¢ @ 55¢; No. 7, 19¢ @ 55¢; No. 8 to 12,
19¢ @ 55¢, in 12 doz. to 100 doz. lots.
Eddystone, Braided, Nos. 8 to 12,
20¢ @ 55¢; 20¢ @ 55¢; 6, 27¢
Harmony Cable Laid Italian, Nos. 7
to 10, 23¢ @ 55¢; lb 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100, \$2.00
Samson, Nos. 8 to 12:
Braided, Drab, 40¢ @ 55¢
50¢; Italian Hemp, 40¢ @ 55¢
50¢; Linen, 65¢; White Cot-
ton, 50¢; Spot Cord.....50¢ @ 55¢
Massachusetts, White.....lb 40¢
Massachusetts, Drab.....lb 45¢
Phoenix, White, Nos. 8 to 12.....27¢
Silver Lake, Dr. lb.

A. Drab, 45¢; A. White, 40¢;
B. Drab, 40¢; B. White, 35¢;
Italian Hemp, 40¢; Linen.....37¢ @ 55¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90¢ @ 55¢
Short Length.....90¢ @ 55¢
Hendryx Standard Wire Picture Cord
90¢ @ 10%
Turner & Stanton Co. Wire Picture
Cord.....90%

Cradles—

Grain.....50%

Crays—

White Round Crays, Cases, 100
gro., \$8.00, \$8.50, \$9.00 and \$10.00
according to grade.

Zelnick's Lumber:
White and Purple, Indelible.....\$1.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black.....\$4.50
Giant Lumber, 5 1/4 in. x 15-16 in.,
round, all colors, \$12.00; Indeli-
ble, \$14.00; Blacks.....\$10.00
Genuine Soapstone, Metal Workers',
5 in. x 1/4 in. Round, \$2.50; 5 in. x
3/4 in. Square, \$1.75; 5 in. x 1 1/2 in.,
\$2.50; 5 in. x 1 3/4 in. Square, \$3.00
Succmark, Black, \$2.25; Blue, Red
and Yellow.....\$2.50

Crooks, Shepherds—

American Fork & Hoe Co.:
Montana.....1/2 doz. \$4.50

Crow Bars—See Bars, Crow.**Cultivators—**

American Fork & Hoe Co.:
Victor Garden.....50¢ @ 10%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, 1/2 doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....1/2 doz. \$3.00
Wm. Rogers & Son.....1/2 doz. \$2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....60%
B. Mfg. Co.....40%
Woodward.....50%

Meat and Food—

American.....30%
Nos. 401 402 403 404 405 406 407
Each.....\$5 \$7 \$10 \$12 \$25 \$50 \$60
Enterprise:
Nos. 5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 75¢ @ 75¢
No. 292, \$1.50.....40¢ @ 75¢
P. S. & W. Co.:
Ideal.....40¢ @ 10¢ @ 55¢
Hales.....60¢ @ 55¢
Little Giant.....1/2 doz. 40¢ @ 55¢
Nos. 305 310 312 320 322
Each.....\$3.50 \$4.00 \$4.00 \$7.00 \$8.50
New Triumph No. 605, 1/2 doz. \$24.00
40%

Russwin Food, No. 1, \$24.00; No. 2,
\$27.00; 3, \$42.00.....45¢ @ 10¢ @ 10¢
\$15.00.....\$18.00

Enterprise Beef Shavers.....25¢ @ 30¢

Siaw and Kraut—

Henry Diston & Sons:
Siaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Siaw Cutters, 1 Knife.....1/2 doz. \$3.00
Combined Siaw Cutter and Corn
Grater.....1/2 doz. \$4.00

Tobacco—

All Iron, Cheap.....doz. \$4.25 @ 4.50

Enterprise.....25¢ @ 30¢
National, 1/2 doz., No. 1, \$21; No. 2,
\$18.....40%

Diggers, Post Hole, &c—

Disston's:
Rapid, 1/2 doz., \$24.00.....25%
Samson, 1/2 doz., \$34.00.....25%
Iwan's Pat. Post Hole and Well
Auger.....40%
Vaughan Pattern Post Hole Augers
1/2 doz., \$7.00
Perfection Post Hole Diggers.....\$8.50
Split Handle Post Hole Diggers,
doz., \$7.50
Hercules Pattern, 1/2 doz., \$9.50
Kohler's, 1/2 doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$9.00; Rival,
\$8.50; Pioneer.....\$7.50
Never-Break Crucible Steel Post
Hole Diggers.....60%

Dividers—See Compasses.**Drawing Knives—**

See Knives, Drawing.

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling
Machines.....\$1.50 @ 1.75

Breast, Millers Falls.....15¢ @ 10¢
Breast, P. S. & W.....35%
C. & C. Ratchet.....25%
Reversible Ratchet Die Stocks.....25%
Goodell Automatic Drills 50¢ @ 10¢ @ 60¢ @ 10¢
Millers Falls Automatic Drills,
Graves', per doz., Nos. 1, \$4.86;
2, \$5.16.
Millers Falls Automatic Drills, 33% @ 10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Im-
proved.....40¢ @ 40¢ @ 55¢
Ratchet, No. 012.....40¢ @ 40¢ @ 55¢
Ratchet, Celebrated.....40¢ @ 40¢ @ 55¢
Ratchet, Whitney's, P. S. & W.,
40¢ @ 100%
Star Drills.....50¢ @ 10%
Star Pipe Drills.....50%
Star Drill Holders.....50¢ @ 10¢ @ 10%
Star Drill Points.....50¢ @ 10¢ @ 10%
Whitney's Adjustable, No. 10, \$12.00,
33% @ 55%

Twist Drills—

Bit Stock.....70¢ @ 70¢ @ 10%
Taper and Straight Shank.....65¢ @ 65¢ @ 10%

Drivers, Screw—

Servic Dyer Bits, per doz. 45¢ @ 50¢

Balsey's Screw Holder and Driver, 1/2
doz., 2 1/2-in., \$6; 4-in., \$7.50; 6-in.,
\$9
Buck Bros', Screw Driver Bits.....30%
Champion.....30%
Disston's Screw Drivers, Handles
and Ferrules.....70%
Elmore Tool Mfg. Co.:
Elmore.....60%
Hartford.....65%
Indestructible.....55¢ @ 75¢
Standard Neverturn.....75¢ @ 55¢
Star.....75¢ @ 55¢
Screw Driver Bits.....25%
Fray's Hol. H'dle Sets, No. 3, \$12.50,
Ford's Brace Screw Drivers.....40¢ @ 10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65¢ @ 65¢ @ 10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, 1/2 doz. Nos. 11, \$9.95;
12, \$13.75; 20, \$8.17; 21, \$8.46; 41,
\$13.43; 42, \$17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540
40¢ @ 10%

Eave Trough, Galvanized—

Territory. Gal. Steel, Copper.

Northeastern.....75¢ @ 10¢ @ 55¢ 50¢ @ 10%
Eastern.....80% 50¢ @ 10%
Central.....80¢ @ 10¢ @ 55¢ 50¢ @ 10%
Northwestern.....80¢ @ 10¢ @ 55¢ 50¢ @ 10%
Western.....80¢ @ 55¢ 50¢ @ 10%
Tennessee.....80¢ @ 55¢ 50¢ @ 10%
Southern.....75¢ @ 10% 50¢ @ 55¢
Southwestern.....75¢ @ 10¢ @ 55¢ 50¢ @ 55¢

Terms.—2% for cash. Factory shipments
generally delivered.

Note.—Lower prices are quite general
owing to market irregularities.

See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments all territories:
Galv. Steel, Galv. C. I. and
Copper.

Sizes 2, 3, 4.....30%
Sizes 1 1/2, 2 1/2, 3 1/2, 5, 6.....60¢ @ 10%
No. 26.....50%
No. 24.....25%
Copper Elbows.....50%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40¢ @ 10¢ @ 10%
Edwards, Royal Blue.....40¢ @ 10¢ @ 10%
Reeves, Dover, Flat Crimp, 40¢ @ 10¢ @ 55¢

Emery, Turkish—

1 to 5 1/2 to
16; 220; Flour.

Kegs.....lb. 5¢ 5 1/2¢ 3 1/2¢
14 Kegs.....lb. 5 1/2¢ 5 1/2¢ 3 1/2¢
1/4 Kegs.....lb. 5 1/2¢ 6¢ 4¢

10-lb. cans, 6¢ 7¢ 8¢
 10-lb. cans, less than 10, 10¢ 10¢ 8¢
 Less quantity, 10¢ 10¢ 8¢
 NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—
 Ford's Auger Bit Extensions, 40¢ & 50¢
Extractors, Lemon Juice—
 —See Squeezers, Lemon.

Fasteners, Blind—
 Zimmerman's Jap'd and Galv., 50¢ & 50¢
 Walling's, 50¢ & 50¢
 Upson's Patent, 50¢ & 50¢

Cord and Weight—
 Ives, 10¢ doz., \$1.08
 Titan, 10¢ doz., \$0.66
Corrugated—
 Acme Corrugated Fasteners, 70¢

Faucets—
 Cork Lined, 50¢ & 10¢ 60¢
 Metallic Key, Leather Lined, 60¢ & 10¢ 70¢
 Red Cedar, 40¢ & 10¢ 40¢ & 10¢
 Petroleum, 70¢ & 10¢ 70¢
 B. & L. B. Co., 60¢ & 10¢
 Metal Key, 60¢ & 10¢
 Star, 60¢ & 10¢
 West Lock, 60¢ & 10¢
 John Sommer's Peerless Tin Key, 40¢
 John Sommer's Boss Tin Key, 50¢
 John Sommer's Victor Mtl. Key, 50¢ & 10¢
 John Sommer's Duplex Metal Key, 60¢
 John Sommer's Diamond Lock, 40¢
 John Sommer's I. X. L. Cork Lined, 50¢
 John Sommer's Reliable Cork Lined, 50¢ & 10¢
 John Sommer's Chicago Cork Lined, 60¢
 John Sommer's O. K. Cork Lined, 50¢
 John Sommer's No Brand, Cedar, 50¢
 John Sommer's Perfection, Cedar, 40¢
 Self Measuring:
 Enterprise, Self Measuring and Pump, 10¢ doz., \$36.00
 Lane's, 10¢ doz., \$36.00
 National Measuring, 10¢ doz., \$36.00 & 10¢

Felloe Plates—
 See Plates, Felloe.

Files—Domestic—
 List Nov. 1, 1899.
 Best Brands, 70¢ & 10¢ 75¢ & 10¢
 Standard Brands, 75¢ & 10¢ 80¢ & 10¢
 Lower Grade, 75¢ & 10¢ 80¢ & 10¢
 Diston's Superior, 60¢
 Gold Medal, 70¢
 McCaffrey's American Standard, 60¢ & 10¢ 10¢

Imported—
 Stubbs' Tapers, Stubbs' list, July 24, '97, 33¢ & 10¢ 40¢

Fixtures, Fire Door—
 Richards Mfg. Co.,
 Universal, No. 103; Special, No. 104
 Fusible Links, No. 96
 Expansion Bolts, No. 107

Grindstone—
 Net Prices:
 Inch, 15¢ 17¢ 19¢ 21¢
 Per doz., \$3.60 3.85 4.15 4.65
 Peck, Stow & Wilcox Co.,
 In, 15¢ 17¢ 19¢ 21¢
 \$4.00 4.40 4.75 5.50 6.50
 Reading Hardware Co., 60¢

Fodder Squeezers—
 See Compressors.

Forks—
 American Fork & Hoe Co.:
 Iowa Dig-Ezy Potato, 70¢ & 50¢
 Hay, Regular, 3-time, 45¢ & 20¢ 12¢
 Hay, Regular, 4-time, 60¢ & 7½¢
 Champion, Hay, 60¢ & 12¢
 Acme, Hay, 60¢ & 20¢
 Manure, Regular, 4-time, 65¢
 Manure, Regular, 5 and 6 time, 70¢
 Champion, Manure, 65¢ & 30¢
 Columbia, Manure, 70¢
 Acme, 4-time, 60¢ & 10¢
 Round Shoulder Header, 4-time, 65¢
 Champion, Header, 65¢
 Dakota, Header, 65¢
 Kansas Header, 65¢
 Wood, Barley, 65¢
 Steel, Barley, 65¢
 Columbia, Spading, 70¢ & 7½¢ & 50¢

Frames—Wood Saw—
 White, 8' x 1' Bar, per doz. 75¢ & 10¢
 Red, 8' x 1' Bar, per doz. \$1.00 & 1.25
 Red, Dbl. Brace, per doz. \$1.40 & 1.50

Freezers, Ice Cream—
 Qt., 1¢ 2¢ 3¢ 4¢
 Luch, \$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—
 See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.
Fuse—Per 1000 Feet.
 Hemp, 22.75¢
 Cotton, 3.20¢
 Waterproof Sgl. Taped, 3.65¢
 Waterproof Dbl. Taped, 4.40¢
 Waterproof Tpl. Taped, 5.15¢

Gates, Molasses and Oil—
 Stebbins' Pattern, 80¢ & 10¢ 80¢

Gauges—
 Marking, Mortise, 50¢ & 50¢ 10¢
 Chapin-Stephens Co.:
 Marking, Mortise, 50¢ & 50¢ 10¢
 Diston's Marking, Mortise, 60¢ & 10¢
 Wire, Brown & Sharpe's, 33¢
 Wire, Morse's, 25¢
 Wire, P. S. & W. Co., 33¢

Gimlets—Single Cut—
 Numbered assortments, per gro.
 Nail, Metal, No. 1, \$2.00; 2, \$2.30
 Spike, Metal, No. 1, \$1.00; 2, \$1.30
 Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60
 Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window
 See Trade Report.

Glasses, Level—
 Cham-Stephens Co., 65¢ & 10¢
 Diston & Sons, 60¢ & 10¢

Glue, Liquid Fish—
 Bottles or Cans, with Brush,
 25¢ & 10¢ 50¢
 Elwell's, 50¢

Grease, Axle—
 Common Grade, 10-lb. pails, ea.
 85¢; in boxes, 10-lb., 1 lb., \$1.20
 2 lb., \$2.00
 Helmet Hard Oil, 25¢

Griddles, Soapstone—
 Pike Mfg. Co., 33¢ & 33¢ 10¢

Grinders—
 Pike Mfg. Co.:
 Hand and Foot Power, Pyko Nos.
 1, 2, 3; Pyko Primo; Pyko Peer-
 less; Pyko Spiral (foot power), 33¢
 Mower Knife and Tool, \$5.00 & 10¢
 Royal Mfg. Co.:
 Hand and Foot Power, each,
 Nos. 01, \$1.75; 1A, \$2.50; 10,
 \$5.00
 Sickle Grinders, each, Nos. 20,
 \$6.50; 20A, \$6.00; 20A Combined,
 \$6.50
 Disc Grinders, each, \$2.50 & 10¢

Grindstones—
 Pike Mfg. Co.:
 Improved Family Grindstones, 10¢
 inch, 10¢ doz., \$2.00
 Richards Mfg. Co., Eli and Cycle,
 Ball Bearing, mounted, 40¢

Grips, Nipple—
 Perfect Nipple Grips, 40¢ & 10¢ 2¢

Halters and Ties—
 Cow Ties, 70¢ & 10¢ 40¢
 Bridgeport Chain Co.:
 Triumph Coil and Halters, 35¢ & 10¢ 40¢
 Brown Coil and Halters, 45¢ & 10¢ 50¢
 Brown Cow Ties, 50¢ & 50¢ 10¢ 50¢
 Brown Tie Outs, 70¢ & 10¢ 75¢ & 50¢
 Covert Mfg. Co.:
 Web, 30¢ & 2¢
 Jute Rope, 35¢
 Sisal Rope, 40¢
 Cotton Rope, 45¢
 Hemp Rope, 45¢
 Oneida Community:
 Am. Coil and Halters, 40¢ & 10¢ 45¢
 Am. Cow Ties, 45¢ & 50¢
 Niagara Coil and Halters, 45¢ & 50¢ 45¢
 Niagara Cow Ties, 45¢ & 50¢ 45¢

Hammers—
 Heller's Machinists, 55¢ & 10¢ 55¢ & 10¢
 Heller's Farriers, 40¢ & 10¢ 40¢ & 10¢
 Peck, Stow & Wilcox Co.:
 Crucible Steel, 40¢ & 10¢ 50¢
 Farriers', 40¢ & 10¢ 50¢
 Ring Ring, 40¢ & 10¢ 50¢
 Machinists', 65¢ & 10¢ 50¢
 Blacksmiths', 50¢
 Elmore Shoemakers' Hammers, 75¢
 Fayette R. Plumb:
 A. E. Nail, 40¢ & 2½¢ 40¢ & 12½¢
 Eng. and B. S. Hand, 50¢ & 10¢ 50¢ & 10¢
 Machinists' Hammers, 60¢ & 10¢ 50¢
 Rivet and Timers, 40¢ & 10¢ 40¢ & 12½¢
 Victor Magnetic Tack, 10¢ gro., 7.75

Heavy Hammers and Sledges—
 Under 3 lb., per lb., 50¢ . . . 80¢ & 10¢
 3 to 5 lb., per lb., 40¢ . . . 80¢ & 10¢
 Over 5 lb., per lb., 30¢ . . . 80¢ & 10¢
 Over 5 lb., per lb., 30¢ . . . 80¢ & 10¢

Handles—
 Agricultural Tool Handles
 Axe, Pick, 60¢ & 10¢ 60¢ & 10¢
 Hoe, Rake, 40¢
 Fork, Shore, Spade, 40¢
 Long Handles, 40¢
 D Handles, 40¢

Cross-Cut Saw Handles—
 Atkins, 40¢
 Diston's Handles and Saw Tabs, 45¢

Mechanics' Tool Handles—
 Auger, assorted, 10¢ gro. \$3.00 & 10¢
 Broad Axl., 10¢ gro. \$1.65 & 10¢
 Chisel Handles, Ass'd, per gro.:
 Tanged Firmer, Apple, \$2.40 & 10¢
 \$2.65; Hickory, \$2.15 & 10¢
 Socket Firming, Apple, \$1.75 & 10¢
 \$1.95; Hickory, \$1.60 & 10¢
 Socket Framing, Hickory, \$1.60 & 10¢

File, assorted, 10¢ gro. \$1.30 & 10¢
 Hammer, Hatchet, 60¢ & 10¢ 60¢ & 10¢
 Hand Saw, Varished, doz., 80¢
 85¢; Not Varished, 65¢ & 75¢
 Plane Handles:
 Jack, doz., 30¢; Fore, doz., 45¢
 Chapin-Stephens Co.:
 Carving Tool, 30¢ & 30¢ 10¢
 Chisel, 60¢ & 10¢
 File and Axl., 60¢ & 10¢
 Saw and Plane, 30¢ & 10¢
 Screw Driver, 30¢ & 10¢
 Millers Falls Adj. and Ratchet Auger
 Handles, 15¢ & 10¢
 Nicholson Simplicity File Handle,
 10¢ gro. \$0.85 & 10¢

J. L. Osgood:
 Indestructible File and Tool,
 gro., No. 1, \$3.00; No. 2, \$3.50;
 No. 3, \$3.00; No. 4, \$3.50;
 5, \$10.00 . . . gro. lots 10¢

W. A. Zelnicker Supply Co.:
 Hammer, 10 doz., 12 in., \$2.00;
 14 in., \$2.00; 16 in., \$2.30; 18
 12, \$2.50; 20 in., \$2.70; 22 in.,
 \$3.00; 24 in., \$3.30; 26 in., \$3.50;
 30 in., \$3.80
 Sledge, 10 doz., oral, 30 in.,
 \$3.80; octagon, 30 in., \$3.80;
 oral, 36 in., \$4.00; octagon,
 36 in., \$4.00
 Are, 10 doz., 28 to 34 in., \$5.00;
 36 in., \$5.80
 Adze, 10 doz., 36 in., \$5.80; 36
 in., \$7.80
 Pick, 10 doz., R. R., 36 in.,
 \$8.00; coal, 31 in., \$5.80
 Hatchet, 10 doz., 12 to 14 in.,
 \$2.00

Hangers—
 NOTE.—Barn Door Hangers are gen-
 erally quoted per pair, without track,
 and for Hangers per double set
 with track, etc.
 Chicago Spring Butt Co.:
 Friction, 25¢
 Oscillating, 25¢
 Big Twin, 25¢
 Chisholm & Moore Mfg. Co.:
 Baggage Car Door, 50¢
 Elevator, 30¢
 Railroad, 50¢
 Cronk & Carrier Mfg. Co.:
 Loose Axle, 60¢ & 10¢
 Roller Bearing, 70¢
 Griffin Mfg. Co.:
 Solid Axle, No. 10, \$12.00, 60¢ & 10¢
 Roller Bearing, No. 11, \$15.00,
 60¢ & 10¢
 Roller Bearing, Ex. Hy., No.
 22, \$18.00, 60¢ & 10¢
 Bull Dog, \$24.00, 60¢ & 10¢
 Lane Bros. Co.:
 Parlor, Ball Bearing, \$1.00:
 Standard, \$3.15; No. 105, \$2.85;
 New Model, \$2.80; New Cham-
 pion per set of 4 Hangers, com-
 plete with track, \$2.25
 Barn Door, Standard, 60¢ & 10¢
 Hinged, net \$6.08
 Covered, 60¢ & 50¢
 Special, 70¢ & 50¢
 Trolley Hangers and track, 50¢
 Lawrence Bros.:
 Cleveland, 70¢ & 7½¢
 Clipper, No. 75, 60¢
 Crown, 55¢ & 10¢
 Cyclone, No. 40, net \$6.50
 Tandem, No. 50, net \$7.50
 New York, 55¢ & 10¢
 Trolley, No. 30, pair, \$1.25
 McKinney Mfg. Co.:
 Roller Bearing, Nos. 1 and 2, 70¢
 Anti-Friction, 60¢
 Hinged Hangers, King Charm, 60¢
 Richards Mfg. Co.:
 Hangers, Nos. 47, 48, 117, 247,
 60¢ & 50¢
 Pioneer Wood Track, No. 3, \$2.25
 Roller B'g St'l Track No. 12, \$2.20
 Roller B'g St'l Track No. 13, \$2.50
 Roller B'g, Nos. 39, 41, 43,
 70¢ & 7½¢

Hero, Adj. Track No. 19, 50¢ & 10¢
 Adjustable Track Tandem Trol-
 ley Track No. 16, 50¢ & 10¢
 Seal, Steel Track No. 8, \$2.25
 Auto Adj. Track No. 22, 50¢ & 50¢
 Trolley B. D. No. 17, \$1.25; F.
 No. 12, \$1.25; No. 121,
 \$2.45; No. 150, \$2.50
 Safety Underwriters F. D. No.
 101, 50¢
 Tandem No. 41, 2½¢ & 3 60¢ & 10¢
 Palace, Adjustable Track No.
 132, 50¢ & 50¢
 Royal, Adjustable Track No.
 122, 50¢ & 10¢
 Ives' Wood Track No. 1, \$2.25
 Trolley B. D. No. 20, 50¢ & 10¢
 Trolley B. D. No. 24, \$1.30; No.
 27, \$1.40; No. 28, \$1.40
 Roller Bearings, Nos. 37, 38, 39,
 41, 42, 44, Sizes 1 and 2, 70¢ & 10¢
 Anti-Friction No. 42, No. 44,
 sizes 2½ and 3, 60¢
 Hinged Tandem No. 48, 60¢ & 50¢
 Folding Door B. B. Swivel No.
 135, 40¢
 Taylor & Roggis Fy Co.'s Kid-
 deys Roller Bearing, 10 doz.,
 4 in., \$12.00; 5 in., \$14.00 & 10¢
 Myers Stayon Hangers, 60¢

Hangers—Garment—
 Pullman Trouser, 10 gro., No. 1
 \$9.00; No. 4, \$24.00; No. 5, \$16.50;
 No. 8, Black Enamel, \$7.50; No. 10,
 \$21.00; No. 12, \$8.00; No. 15, Rods,
 \$9.00; No. 18, Loops, \$10.00
 Victor Folding, 10 gro. \$6.60

Gate—
 Myers' Patent Gate Hangers, 10 doz.,
 net 50¢

Joist and Timber—
 Lane Bros. Co., 35¢

Hasps—
 Griffin's Security Hasp, 50¢ & 10¢
 McKinney's Perfect Hasp, 10 doz., 60¢

Hatchets—
 Regular list, first qual. 50¢ & 10¢ 60¢
 Second quality, 60¢ & 10¢ 60¢

Heaters, Carriage—
 Clark, No. 5, \$1.25; No. 5B, \$1.50; No.
 3, \$1.75; No. 3D, \$2.00; No. 7D, \$2.25;
 No. 8, \$2.50; No. 1, \$3.00
 Clark Coal, 10 doz., \$0.75, 20¢

Hinges—
 Blind and Shutter Hinges
 Surface Gravity Locking Blind:
 Doz. Sets with Fastenings, No.
 1, \$0.70; No. 3, \$1.25; No. 5,
 \$2.65

Mortise Shutter, 80¢
 Mortise Reversible Shutter, 80¢
 North's Automatic Blind Fixtures,
 No. 2, for Wood, \$9.00; No. 3, for
 Brick, \$11.50
 Charles Parker Co., 70¢ & 75¢
 Parker Wire Goods Co.
 Hale & Benjamin Automatic Blind
 Hinges, 20¢
 Hale's Blind Awning Hinges, No.
 110, for wood, \$9.00; No. 111, for
 brick, \$9.00, 20¢

Reading's Gravity, 60¢
 Stanley's Steel Gravity Blind Hinges,
 No. 1647, 10 doz. sets, without
 screws, \$0.95; with screws, \$1.25.
 Wrightsville Hardware Co.:
 O. S., Lull & Porter, 75¢ & 50¢
 Acme, Lull & Porter, 75¢
 Queen City Reversible, 75¢
 Shepard's Noiseless, Nos. 60, 65,
 55, 75¢ & 50¢
 Niagara Gravity Locking, Nos. 1,
 3 & 5, 75¢ & 50¢
 Clark's O. P., No. 1, 75¢ & 10¢
 Clark's O. P., Nos. 3 and 5, 75¢ & 50¢
 Tip Pat'n., No. 1, 75¢ & 10¢
 Clark's No. 3, 75¢ & 50¢
 Buffalo Gravity Locking, Nos. 1,
 3 & 5, 70¢ & 10¢ & 50¢
 Shepard's Double Locking, 75¢
 Champion Gravity Locking, 75¢ & 10¢
 Pioneer, 75¢ & 10¢
 Empire, 65¢
 W. H. Co.'s Mortise Gravity Lock-
 ing, No. 2, 60¢ & 10¢

Gate Hinges—
 Clark's or Shepard's—Doz. sets:
 No. 1, 2 3
 Hinges with L'v'chs, \$2.00 2.70 5.00
 Hinges only, 1.25 1.90 3.50
 Latches only, 70 75 33

New England:
 With Latch, 10 doz., \$2.00
 Without Latch, 10 doz., \$1.60
Reversible Self-Closing:
 With Latch, 10 doz., \$1.75
 Without Latch, 10 doz., \$1.35
Western:
 With Latch, 10 doz., \$1.75
 Without Latch, 10 doz., \$1.15
 Wrightsville Hardware Co.:
 Shepard's or Clark's Hinges and
 Latches, Hinges only or Latches
 only, Nos. 1, 2 or 3, 70¢

Miscellaneous—
 Griffin Mfg. Co., Flour de Lis Sur-
 face Hinges, 10 doz. prs., \$1.00

Pivot Hinges—
 Bommer Bros. Pivot, Ball Bear-
 ing, 60¢
 Lawson Mfg. Co., Matchless, 30¢

Spring Hinges—
 Holdback, Cast Iron, \$6.75 & 10¢
 Non-Holdback, Cast Iron, \$6.50 & 10¢
 J. Bardsley:
 Bardsley's Non-Checking Mor-
 tise Floor Hinges, 40¢
 Bardsley's Patent Checking, 33½¢
 Bommer Bros.:
 Spring Butt Hinges, 40¢
 Surface Floor, Ball Bear-
 ing, 40¢
 Mortise Floor, Ball Bearing, 40¢
 Lavatory Hinges, 40¢
 Non-Holdback Screen Door,
 Nos. 2000 and 900, 40¢
 Holdback Screen Door, No.
 999, 10 gro., \$9.00

Chicago Spring Butt Co.:
 Chicago Spring Hinges, 25¢
 Triple End Spring Hinges, 50¢
 Chicago (Ball Bearing) Floor, 40¢
 Garden City Engine House, 25¢
 Keene's Saloon Door, 25¢
 Columbian Hardware Co.:
 Acme, Wrought Steel, 30¢
 Acme, Brass, 25¢
 American, 30¢
 Columbia, 10 gr., No. 14, \$9.00,
 No. 18, \$25.00
 Columbia, Adj., No. 7, 10 gr., \$12.00
 Gem, new list, 30¢
 Clover Leaf and Acorn, per
 gro., \$12.00
 Oxford, new list, 30¢
 Spring Spring Hinges, 65¢ & 10¢
 Columbian Steel, 65¢ & 10¢
 Lawson Mfg. Co.:
 Matchless Spring Hinges, 30¢
 Matchless Jamb Hinges, 30¢
 Richards Mfg. Co.:
 Superior Double Acting Floor
 Hinges, 40¢
 Shelby Spring Hinge Co.:
 Buckeye All Steel Holdback
 Screen Door, 10 gr., \$9.00
 Chief Ball Bearings Floor
 Hinge, 50¢
 Ball Bearing Door, 25¢
 No. 777, Sheet Steel Holdb'k,
 10 gr., pr., \$9.00
 Standard Mfg. Co.:
 Champion Double Acting Door
 Hinge, 25¢ & 10¢ & 10¢
 Standard Double Acting Floor
 Hinge, 25¢ & 10¢ & 10¢
 Superior Spring Hinge Co.:
 Superior Floor Hinges, 40¢
 Spring Hinges, 40¢

Wrought Iron Hinges—
 Strap and T Hinges, etc., list
 February 10, 1908:

Light Strap Hinges, 65¢
 Heavy Strap Hinges, 75¢
 Light T Hinges, 60¢
 Heavy T Hinges, 40¢ & 10¢
 Extra Hvy. T Hinges, 65¢ & 10¢
 Hinge Hasps, 40¢
 Cor. Heavy Strap, 75¢
 Cor. Ex. Heavy T, 65¢ & 10¢
 Screw Hook 6 to 12 in., 10 3/4¢
 and Strap, 13 to 20 in., 10 3/4¢
 22 to 36 in., 10 3/4¢
 Screw Hook and Eye:
 6 to 12 in., 10 3/4¢
 13 to 20 in., 10 3/4¢
 22 to 36 in., 10 3/4¢

Hitchers, Stall—
 Covert Mfg. Co., Stall Hitchers, 30¢ & 2¢

Hods—Coal—
 M'far's list, price per gross:
 Inch, 15 16 17 18
 Galv. Open, \$35 \$39 \$42 \$46
 Jap. Open, 26 28 31 35
 Galv. Funnel, 43 48 52 56
 Jap. Funnel, 33 36 39 43

Masons' Etc.
 Cleveland Wire Spring Co.:
 Steel Brick, No. 122, each \$1.05
 Steel Mortar, No. 158, each \$1.35

Extra 10% often given on most of these Hinges.

Extra, 5¢

Hoes—Eye—
Scovill and Oval Pattern,
 60¢@10¢@60¢@10¢@10¢
Grub, list Feb. 23, 1899,
 70¢@10¢@70¢@10¢@10¢
 D. & H. Scovill.....27½¢
 Am. Fork & Hoe Co. (Scovill Pat-
 tern).....60¢@5¢

Handled—
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
 Star Double Bit.....\$2.50
 American Fork & Hoe Co.:
 Regular, Cotton.....75¢@10¢@5¢
 Crescent, Cultivator.....75¢@10¢
 Mattock, Senior.....70¢
 Mattock, Junior.....70¢
 Sprouting.....50¢
 Tobacco, Harper's.....66¢@15¢@10¢
 Warren.....55¢@10¢@5¢
 Ivanhoe.....65¢@15¢@10¢
 Cultivator, B B 6.....70¢@10¢@5¢
 Cultivator, B B 6½.....70¢@10¢@5¢
 Weeding, Acme.....72½¢@10¢@5¢
 Suffle, Lightning.....60¢@5¢

Hoisting Apparatus—
 See **Machines, Hoisting.**

Holders—Bit—
 Angular, ½ doz, \$21.00.....45¢@10¢

Door—
 Bardeley's, Iron, 40%; Brass and
 Bronze.....25¢
 Empire.....25¢
 Pullman.....25¢
 Richards Mfg. Co., No. 117, Ever-
 ready, 40%; Nos. 118, 119, Sure
 Grip.....50¢
 Superior.....40¢

File and Tool—
 Nicholson File Holders and File
 Handles.....33½¢@10¢

Fruit Jar—
 Triumph Fruit Jar Holder, ½ gross,
 \$18.00; ½ doz.....\$2.00

Trace and Rein—
 Fernald Double Trace Holder, ½ doz,
 pairs.....\$1.25
 Dash Rein Holder, ½ doz.....\$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian and Swaty,
 50%; German.....33½¢

Hooks—Cast Iron—
 Bird Cage, Reading.....40¢
 Clothes Line, Reading List.....40¢
 Coat and Hat, Reading.....60¢@5¢
 Coat and Hat, Wrightville.....60¢@5¢
 Harness, Reading List.....40¢

Wire—
 Belt, Nos. 1 to 15.....75¢@10¢@80¢
 Wire C. & H. Hooks.....80¢@80¢@10¢
 Bradley Metal Clasp Wire, Coat and
 Hat, 75¢@10¢@80¢; Ceiling, 75¢@10¢@80¢
 Columbian Hdw. Co., Gem.....75¢@10¢
 Parker Wire Goods Co., King, 75¢@10¢
 Wire Goods Co.:
 Acme, 60¢@10¢; Chief, 70¢@10¢;
 Crown, 5¢; Czar, 65¢@10¢; V
 Brace, 75¢; Czar Harness, 50%;
 Ceiling, 75¢.

Wrought Iron—
 Box, 6 in., per doz., \$0.90; 8 in.,
 \$1.15.
 Cotton.....dos. \$1.25@1.50
 Wrought Staples, Hooks, all sizes,
 See **Wrought Goods.**

Miscellaneous—
 Hooks, Bench, see **Stops, Bench.**
 Bush, Light, doz., \$6.20; Medium,
 \$6.75; Heavy, \$7.65
 Grass, boat, all sizes, per doz.,
 \$2.75@3.00
 Grass, common grades, all sizes,
 per doz.....\$1.25@1.50
 Whiffletree.....lb. 5¢@6¢
Hooks and Eyes:
 Brass.....60¢@60¢@10¢
 Malleable Iron.....70¢@70¢@10¢
 Covert Mfg. Co. Gate and Scuttle
 Hooks.....40¢
 Turner & Stanton Co. Cup and
 Shoulder.....55¢@10¢
 Bench Hooks—See **Bench Stops.**
 Corn Hooks—See **Knives, Corn.**

Horse Nails—
 See **Nails, Horse.**

Horseshoes—
 See **Shoes, Horses.**

Hose, Rubber—
 Garden Hose, ¾-inch:
 Competition.....ft. 6¢@6½¢
 3-ply Guaranteed.....ft. 8½¢@9¢
 4-ply Guaranteed.....ft. 9½¢@12¢
 Cotton Garden, ¾-in., coupled:
 Low Grade.....ft. 8¢@9¢
 Fair Quality.....ft. 10¢@11¢

Irons—Sad—
 From 4 to 10.....lb. 2¼¢@2½¢
 B. B. Sad Irons.....lb. 3¼¢@3½¢
 Mrs. Potts', cents per set:
 Nos. 50 55 60 65
 Jap'd Caps.....86 93 96 93
 Tin'd Caps.....91 98 1.01 98
 New England Pressing.....lb. 3¼¢@4¢

Bar and Corner—
 Richards Mfg. Co., Bar, 60¢@10¢;
 Corner.....60¢

Pinking—
 Pinking Irons.....dos. 60¢@65¢

Irons, Soldering
 See **Coppers.**

Jacks, Wagons—
 Covert Mfg. Co.:
 Auto Saver.....30¢@2¢; Steel, 45¢
 Lockport.....50¢
 Lane's Steel.....30¢@5¢
 Richards' Tiger Steel, No. 130.....50¢@10¢
 Smith & Hemenway Co.'s.....25¢

Ladder—
 Richards Mfg. Co., Ladder Jacks, 5¢

Jointers—
 Pike Mfg. Co., Saw Jointers, \$7.00-40%

Kettles—
 Brass, Spun, Plain.....20¢@25¢
 Enamelled and Cast Iron—See **Ware,**
 Hollow.

Knives—
Butcher, Kitchen, &c.—
 Foster Bros' Butcher, &c.....30¢
 Wilkinson Shear & Cutlery Co.....60¢

Corn—
 Columbian Cutlery Co., Wilcutt
 Brand Knives and Hooks.....60¢
 American Fork & Hoe Co.:
 Easy Cut, ½ doz, No. 10 C H.....\$2.10
 Easy Cut, ½ doz, No. 10 B C H.....\$2.20
 Acme, ½ doz.....\$2.35
 Dent, ½ doz.....\$2.35
 Adjustable, Serrated, ½ doz.....\$1.90
 Serrated, ½ doz.....\$1.85
 Yankee, No. 1 C H.....\$1.35
 Yankee, No. 2 C H.....\$1.15

Drawing—
 Standard List.....80¢@10¢-
 C. E. Jennings & Co., Nos. 45, 46,
 25¢@7½¢
 Jennings & Griffin, Nos. 41, 42,
 66¢@7½¢
 Watrous.....16½¢
 L. & J. J. White.....20¢@25¢

Hay and Straw—
 Serrated Edge, per doz, \$5.00@5.50
 Iwan's Sickle Edge.....\$3.50
 Iwan's Serrated.....\$3.00

Miscellaneous—
 Farriers'.....dos. \$2.60@3.55
 Wostenholm's.....½ doz, \$3.00@3.25

Knobs—
 Base, 2½-inch, Birch or Maple,
 Rubber Tip.....gro. \$1.25@1.40
 Carriage, Jap., Drive, all sizes,
 gro. 35¢@40¢
 Door, Mineral.....dos. 65¢@70¢
 Door, Por. Jap'd.....dos. 70¢@75¢
 Door, Por. Nickel.....dos. \$2.05@2.15
 Hardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—
 See **Belting, Leather**

Ladders, Store, &c.—
 Lane's Store.....25¢
 Myers' Noiseless Store Ladders.....50¢
 Richards Mfg. Co.:
 Improved Noiseless No. 112.....50¢
 Climax Shelf, No. 113.....50¢
 Trolley, No. 109.....50¢

Ladies, Melting—
 L. & G. Mfg. Co., Melting and
 Plumbers'.....25¢
 P. S. & W.....40¢@10¢
 Reading.....60¢

Lamps—
 Hammer's M. I. Hand.....45¢

Lanterns—Tubular—
 Regular, No. 0.....dos. \$1.00@1.50
 Side Light, No. 0.....dos. \$1.25@1.75
 Hinge Globe, No. 0.....dos. \$1.25@1.75
 Other Styles.....40¢@5¢

Bull's Eye Police—
 3-inch.....\$3.75@4.00

Latches—Thumb—
 Roggin's Latches, Jap'd, with
 Screws.....dos. 35¢@40¢

Door—
 Cronk & Carrier Mfg. Co., No. 101,
 Richards' Bull Dog, Heavy, No. 123,
 55¢@5¢
 Richards' Trump, No. 121.....\$1.50

Leaders, Cattle—
 Small.....dos. 50¢; large, 60¢
 Covert Mfg. Co.:
 Cotton, 45%; Hemp, 45%; Jute,
 35%; Sisal, 20%.

Leathers, Pump—
 See **Pumps—**

Lifters, Transom—
 R. & E.....10%

Lines—
 Wire Clothes, Nos. 18 19 20
 100 feet.....\$2.30 1.95 1.75
 75 feet.....\$1.95 1.65 1.50
 Samson Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3.....40¢
 Solid Braided Masons'.....50¢
 Silver Lake Braided Chalk, No. 0,
 \$5.00; No. 1, \$6.50; No. 2, \$7.00;
 3, \$7.50.....per gr. 20¢
 Masons' Lines, Shade Cord, &c.,
 White Cotton, No. 3½, \$1.50; No. 4,
 \$2.00; No. 4½, \$2.50; Colors, No. 3½,
 \$1.75; No. 4, \$2.25; No. 4½, \$2.75;
 Linen, No. 3½, \$2.50; No. 4, \$3.50;
 No. 4½, \$4.50.....20¢
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50.....20¢
 Clothes Lines, White Cotton: 50 ft.,
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
 100 ft., \$5.25.....20¢
 Turner & Stanton Co.:
 Solid Braided Chalk, Masons' and
 Awning Lines.....40¢
 Clothes Lines, White Cotton.....20¢
 Shade Cord, Cotton or Linen.....20¢

Locks—Cabinet—
 Cabinet Locks.....33½¢@33½¢@5¢

Door Locks, Latches, &c.—
 NOTE—Not Prices are very often made
 on these goods.
 Reading Hardware Co.....40¢
 R. & E. Mfg. Co.....10%

Padlocks—
 R. & E. Mfg. Co. Wrought Steel and
 Brass.....75¢@10¢

Sash, &c.—
 Ives' Patent:
 Crescent.....10¢
 Automatic Gravity Metal Sash, ½
 gro. \$19.58.....10¢
 Window Ventilating.....10¢
 Pullman Patent Ventilating Lock.....25¢
 Reading Sash Locks.....40¢
 Taylor Mfg. Co., Perfect Ventilating,
 ½ doz.....\$0.75@1.00

Machines—Boring—
 Com. Upr't, without Augers,
 \$2.00@2.25
 Com. Angl'r, without Augers,
 \$2.25@2.50
 Ford Auger Bit Co.....\$2.25@2.50
 Jennings, Nos. 1 and 4.....25¢@7½¢
 Millers' Falls.....3.75
 Snell's, Upright, \$2.65; Angular, \$2.90
 Swan's Improved.....40¢@10¢

Corking—
 Reisinger Intrinsic Hand Power.....
 ½ doz, \$48.00

Fence—
 Williams' Fence Machines.....each, \$5.50

Hoisting—
 Moore's Anti-Friction Chain Hoist, 30%
 Moore's Hand Hoist, with Lock
 Moore's Cyclone High Speed Chain
 Hoist.....25¢

Ice Cutting—
 Chandler's.....12½¢

Washing
 Ross Washing Machine Co.: Per doz.
 Ross No. 1.....\$37.00
 Ross Rotary.....\$37.00
 Champion Rotary Banner No. 1.....\$37.00
 Standard Champion No. 1.....\$50.00
 Standard Perfection.....\$27.00
 Cincinnati Square Western.....\$33.00
 Unedda American, Round.....\$33.60

Mallets—
 Hickory.....45¢@50¢
 Lignumvitae.....45¢@50¢
 Tinners' Hickory and Apple-
 wood.....dos. 45¢@50¢

Mangers, Stable—
 Sweet Iron Works.....50%

Mats, Door—
 Acme Flexible Steel.....50%
 Elastic Steel (W. G. Co.), new list, 50%
 Everlasting Flexible Steel.....33½%

Mattocks—
 See **Picks and Mattocks.**

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.—
 Enterprise Mfg. Co.:
 Coffee.....20¢@25¢
 Shell and Corn.....25¢@10¢
 National list Jan. 1, 1902.....30¢
 Parker's Columbia and Victoria.....33½¢
 Parker's Box and Side.....50¢@10¢
 Swift, Lane Bros. Co.....30%

Motors, Water—
 Divine's Red Devil.....30%
 \$2.50 3.50 10.00 15.00.....33½%
 No. 1 2 3 4
 Lippincott's.....1 2 3 4
 No.....\$2.50 3.50 10.00 15.00.....33½%
 Pike Mfg. Co., Tool and Knife
 Grinding.....33½%

Mowers, Lawn—
 NOTE—Net prices are generally quoted
 Cheapest, 10-in., \$5.00; advance
 10¢ for each size.
 Cheap, 10-in., \$2.25; advance 15¢
 20¢ for each size.
 Better Grade, 10-in., \$3.00; ad-
 vance 25¢ for each size.
 12 1½ 16 18-4n.
 High Grade.....\$1.50 4.75 5.00 5.25
 Continental.....60¢
 Great American.....70¢
 Great American Ball B'r'g, new list, 70¢
 Quaker City.....70¢
 Pennsylvania.....60¢
 Pennsylvania, Jr., Ball Bearing
 50¢@10¢@5¢
 Pennsylvania Golf.....50¢
 Pennsylvania Horse.....33½¢@5¢
 Pennsylvania Pony.....40¢@5¢

Nails—
 Wire Nails and Brads, Miscel-
 laneous.....85¢@85¢@10¢
 Cut and Wire. See **Trade Report.**
 Hungarian, Finishing, Upholster-
 ers', &c. See **Tacks.**

Horse—
 Nos. 6 7 8 9 10
 Anchor.....23 21 20 19 18 .. 20 lb.
 net, 12¢
 Coleman.....13 12 12 11 11 net 20 lb
 New Haven.....23 21 20 19 18 .. 20 lb.
 net, 12¢
 Livingston.....19 18 17 16 16 .. 10 lb
 Western.....20 lb 8½¢
 Jobbers' Special Brands.....
 per lb. 9¢

Picture—
 1½ 2 2½ 3 in.
 Brass Hd. gro. 45 55 60 70
 Por. Head, gro. 1.10 1.10 1.10

Upholsters—
 Brass.....30¢
 Plated.....30¢@10¢

Nippers—
 See **Pliers and Nippers.**

Nipples—
 Standard Nipple Co.:
 Wrought Pipe Nipples.....80%

Nuts—Blank or Tapped.
 Cold Punched: Off list.
 Square.....5.40¢
 Hexagon.....6.00¢
 Square, C. T. & R.....5.80¢
 Hexagon, C. T. & R.....6.60¢

Hot Pressed: Off list.
 Square.....5.90¢
 Hexagon.....6.40¢

Oakum—
 Best.....lb. 6½¢
 U. S. Navy.....lb. 6¢
 Navy.....lb. 5¢
 Plumbers' Spun Oakum.....2¼¢@3¢

Oil—
 Pike Mfg. Co., Stonoll.....40%

Oil Tanks—See Tanks, Oil.

Oilers—
 Steel, Copper Plated.....75¢@10¢
 Chase or Paragon:
 Brass and Copper.....50¢@10¢
 Zinc.....65¢@10¢@70¢
 Railroad.....60¢@10¢@10¢
 American Tube & Stamping Co.:
 Spring Bottom Cans.....70¢@70¢@10¢
 Railroad Oilers, &c.....60¢@60¢@10¢
 Hero Fruit Jar Co.:
 Spring Bottom Cans.....70¢@70¢@10¢
 Railroad Oilers, etc.....60¢@60¢@10¢
 Malleable, Hammers' Improved, Nos.
 11, 12 and 13, 10%; Old Pattern,
 Nos. 1, 2, 3, 4, 50%;
 Maple City Mfg. Co.:
 Spring Bottom Cans.....70¢@70¢@10¢
 Railroad Oilers, &c.....60¢@60¢@10¢

Openers—Packing Box—
 Hercules, ½ doz., \$21.00.....30%

Can Openers—
 Per doz.
 Sprague, Iron Handle.....30¢@35¢
 Sprague, Wood Handle.....40¢
 Sardinia Scissors.....\$1.75@3.00
 Can and Bottle Openers, ½ doz.,
 net: Yankee, \$0.75@0.85; Little
 Gem, \$0.50@0.65; Nifty.....\$0.75

Egg—
 Hartigan Nickel Plate, ½ doz., \$2.00;
 Silver Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope, any quantity.....16¢@17¢

Rubber—
 (Fair quality goods.)
 Sheet, C. I.....11¢@12¢
 Sheet, C. O. S.....11¢@12¢
 Sheet, C. B. S.....12¢@13¢
 Sheet, Pure Gum.....4¢@45¢
 Sheet, Red.....40¢@50¢
 Jenkins' '96, ½ lb, 80¢.....25¢

Miscellaneous—
 American Packing.....lb. 7¢@10¢
 Cotton Packing.....lb. 16¢@25¢
 Italian Packing.....lb. 9¢@10¢
 Jute.....lb. 4¢@4½¢
 Russia Packing.....lb. 9¢@10¢

Pails, Water, Well, &c.—
 See **Buckets.**

Paint—
 Dixon's Silica-Graphite, in 1 gal.
 pails and 5 gal. kegs, 25%; pack-
 ages of larger size.....20%

Pans—Dripping—
 Standard List.....75¢@5¢@75¢@10¢
 Edwards, Royal Blue.....75%

Fry—
 Common Lipped:
 Nos.....1 2 3 4 5
 Per doz.....\$0.75 0.85 0.95 1.15 1.30

Refrigerator, Galva.—
 Inch.....12 14 16 18
 Per doz.....\$1.75 2.25 2.80 3.15

Paper—Building Paper
 Asbestos.....lb.
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft., 2½¢
 Roll Board or Building Felt,
 3-32 and ½ in., 45 to 60 lb.,
 per 100 sq. ft.....3½¢
 Mill Board, Sheet, 40 x 40 in.,
 1-32 to ½ in.....3½¢
 Per roll.....3½¢
 Rosin Sized Sheathing: 500 sq. ft.
 Light weight, 25 lbs. to roll,
 48¢@58¢
 Medium weight, 30 lbs. to roll,
 56¢@70¢
 Heavy weight, 40 lbs. to roll,
 75¢@78¢
 Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 ply,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
 Deafening Felt, 9, 6 and 4½ sq.
 ft. to lb., ton.....\$51.50
 Red Rope Roofing, 250 sq. ft.
 per roll.....\$1.75

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton,
 \$34.00@38.00
 2 ply, roll 108 sq. ft.....65¢
 3 ply, roll 108 sq. ft.....88¢
 Slater's Felt (roll 500 sq. ft.) 80¢

Sand Paper and Cloth—
 Flint and Emery.....50¢@10¢
 Garnet Paper and Cloth.....25%

Parers—Apple—
 Goodell Co.:
 Family Bay State.....½ doz. \$15.00
 Improved Bay State.....½ doz. \$36.00
 New Lightning.....½ doz. \$7.00
 Turn Table.....½ doz. \$5.00
 White Mountain.....½ doz. \$5.00
 Ronanza Improved.....each \$7.50
 Dandy.....each \$10.00
 Eureka Improved.....each \$20.00
 New Century.....each \$20.00
 Ranger.....each \$30.00

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or FillersSee *Stuffers or Fillers, Sausage.***Saw Frames—**See *Frames, Saw.***Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Saws—**

Atkins' Circular	45%
Band	50@50&10
Butcher Saws	50
Cross Cuts	50
One-Man Cross Cut	40
Narrow Cross Cut	50
Hand, Rip and Panel	35&50
Miter Box and Compass	40
Mulay, Mill and Drag	45
Wood Saws	40&10
Chapin-Stephens Co.	
Turning Saws and Frames	30@30&10
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30&10&10
Disston's:	
Circular, Solid and Ins'ted Tooth	50
Band, 2 to 18 in. wide	50
Band, 1/4 to 1 1/2	45
Crosscuts	45
Narrow Crosscuts	50
Mulay, Mill and Drag	40
Framed Woodsaws	25
Woodsaw Blades	25
Woodsaw Rods, Tinned	15
Hand Saws, Nos. 12, 9, 9, 9, 16, 10	25
Doz. 12, 9, 9, 9, 16, 10	25
Hand Saws, Nos. 7, 10, 10, 10, 3, 1	25
0, 00, Combination	30
Compass, Key Hole, &c.	25
Hand Ice Saws	45
Butcher Saws and Blades	30
C. E. Jennings & Co.'s:	
Back Saws	25&10
Butcher Saws	25&10
Compass and Key Hole Saws	33&10
Framed Wood Saws	25&10
Hand Saws	12&10
Wood Saw Blades	33&10
Millers Falls:	
Butcher Saws	15&10
Star Saw Blades	15&10
Massachusetts Saw Works:	
Victor Kitchen Saws	40&10&50
Butcher Saws and Blades	35&10
Peace & Richardson's Hand Saws	30
Simonds':	
Circular Saws	45
Crescent Ground Cross Cut Saws	30
One-Man Cross Cuts	40&10
Gang Mill, Mulay and Drag Saws	45
Band Saws	50
Back Saws	25&10
Butcher Saws	25&10
Hand Saws	25&10
Hand Saws, Bay State Brand	45
Compass, Key Hole, &c.	25&10
Wood Saws	40&10
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws	50

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A	25
Disston's:	
Concave Blades	25
Chromol Blades	35
Hack Saw Frames	30
Simonds, 25%; The Best, 35%	
Culley	35
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40&10
Hack Saws, Nos. 175, 180, complete	40&10
Goodell's Hack Saw Blades	40&10
Griffin's Hack Saw Frames	35&10
Griffin's Hack Saw Blades	35&10
Star Hack Saws and Blades	15&10
Sterling Hack Saw Blades	30&10&5
Sterling Hack Saw Frames	30&10&10
Sterling Power Hack Saw Machines, each, No. 1, \$25.00; No. 2, \$30.00	10
Victor Hack Saw Blades	20
Victor Hack Saw Frames	40
Whitaker Mfg. Co.'s:	
National Hand Blades, Hand Frames, Power Blades	40

Scroll—

Barnes No. 1, \$15	25
Barnes' Scroll Saw	40
Barnes' Velocipede Power Scroll Saw, without boring attachment, \$18; with boring attachment, \$20	20
Leater, complete, \$10.00	15&10
Rogers, complete, \$3.50 and \$4.00	15&10

Scales—

Union Platform, Plain, \$2.10 @ \$2.20	
Union Platform, \$1pd. \$2.20 @ \$2.30	
Chatillon's:	
Eureka	25
Favorite	40
Grocers' Trip Scales	50
The Standard Portables	40
The Standard R. R. and Wag-	

Scrapers—

Box, 1 Handle	40
Box, 2 Handle	40
Ship, Light, \$2.00; Heavy, \$1.50	
Chapin-Stephens Co., Box, 30&10&10	
Richards Mfg. Co., Foot	60

Screws—Bench and Hand

Bench, Iron, doz., 1 in., \$2.50 @ 2.75; 1 1/2 in. \$3.00 @ 3.25	
3.50 @ 3.75	
Bench, Wood	20 @ 20&10
Hand, Wood	70 @ 70&10 @ 70&10
Chapin-Stephens Co., Hand	70 @ 70&10 @ 70&10

Coach, Lag and Hand Rail—

Lag, Cone Point	80 @ 80&10
Coach, Gimlet Point	80 @ 80&10
Hand Rail	70 @ 70&10

Jack Screws—

Standard List	70 @ 70&10 @ 70&10
Millers Falls	50 @ 50&10
Swett Iron Works	70 @ 70&10

Machine—

Cut Tread, Iron, Brass or Bronze:	
Flat Head or Round Head	50 @ 50&10
Fullister Head	40 @ 40&10
Rolled Thread, F. H. or R. H.	
Iron	75 @ 75&10
F. H. or R. H., Brass, Nos. 8 to 14	65 @ 65&10

Set and Cap—

Set (Iron)	75 @ 75&10
Set (Steel), not advance over Iron	25
Sq. Hd. Cap	70 @ 70&10
Hex. Hd. Cap	70 @ 70&10
Rd. Hd. Cap	60 @ 60&10
Fullister Hd. Cap	60 @ 60&10

Wood—

List July 23, 1903.	
Flat Head, Iron	87 @ 87&10
Round Head, Iron	85 @ 85&10
Flat Head, Brass	80 @ 80&10
Round Head, Brass	77 @ 77&10
Flat Head, Bronze	75 @ 75&10
Round Head, Bronze	72 @ 72&10
Drive Screws	87 @ 87&10

Scroll Saws—

See <i>Saws, Scroll.</i>	
Scythes—	
Per doz.	
Plain Grass, Cutting Edge Polished	\$6.25 @ \$6.50
Clipped, Bronzed Web	\$6.50 @ \$6.75
Slip Steel, Web and Backs Polished	\$7.00 @ \$7.25
Bush, Weed and Bramble	\$6.50 @ \$6.75
Painted	\$8.25 @ \$8.50
Grain, Painted, Cutting Edge Polished	\$8.25 @ \$8.50
Clipper Grain, Bronze Web	\$8.50 @ \$8.75

Seeders, Raisin—

Enterprise	25 @ 30
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Sets—Axl and Tool—

Fray's Tool Handles, Nos. 1, \$12; 2, \$16; 3, \$12	50
Massachusetts Saw Works, No. 1, \$12; No. 4, \$12; No. 5, \$18	20&10

Garden Tool Sets—

American Fork & Hoe Co.	
Rake, Shovel and Hoe, 1/2 doz. sets, No. 3 P F	25

Sets, Nail—

Octagon	gro. \$3.50 @ \$3.75
Black Bros.	25
Elmore Tool Mfg. Co.	25
Morrill's No. 1	25
Snell's Corrugated Cup Pt.	40&10
Snell's Knurled, Cup Pt.	40&10
Victor Knurled, Cup Pt.	40&10

Rivet—

Regular List	75 @ 75&10
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Saw—

Atkins' Criterion	40
Adjustable	40
Disston's Star, Monarch and Triumph	30
Giant Royal Cross Cut	40 @ 40&10
Morrill's No. 1	15 @ 15&10
Nos. 3 and 4, Cross Cut	20 @ 20&10
No. 5, Mill	30 @ 30&10
Nos. 10, 11, 95	15 @ 15&10
No. 1 Old Style	10 @ 10&10
Special	16 @ 16&10
Royal, Hand	40 @ 40&10
Seymour Smith & Son's	60
Taintor Positive	40 @ 40&10

Shaving

Fox Shaving Sets, No. 30	25
Smith & Hemenway Co.'s	75

Sharpeners, Knife—

Pike Mfg. Co.'s:	
Fast Cut Pocket Knife Hones	15
Mounted Kitchen Sand Stone	15
Natural Grit Carving Knife Hones	30
Quick Cut Emery Carving Knife Hones	15
Quick Edge Pocket Knife Hones	25

Skate—

Smith & Hemenway Co., Eureka	50
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Shaves, Spoke—

Iron	doz. \$1.25
Wood	doz. \$2.00
Chapin-Stephens Co.	50 @ 50&10
Goodell's	40 @ 40&10
Seymour Smith & Son's	30

Shears—

Coat Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.—

Best quality Jap.	70 @ 70&10
Best Quality Nickel	60 @ 60&10
Tailors' Shears	40 @ 40&10
Acme Cast Shears	10 @ 10&10
Columbian Cutlery Co.	
Sheep, 1900 list	30 @ 30&10
Grass	50 @ 50&10
Horse or Mule	50 @ 50&10

W. H. Compton Shear Co.

Japan Handles, Nickel Blades	
Full Nickel	50 @ 50&10
Heinrich's Tailors' Shears	15
National Cutlery Co.'s Nickel Plated	60&10
W. H. Compton Shear Co.	
Best Quality Jap'd	60&10
Best Quality Nickel	50&10
Tailors'	25

Tinners' Snips—

Steel Blades	20 @ 20&10
Steel Laid Blades	30 @ 30&10
Acme Cast Snips	40 @ 40&10
W. H. Compton Shear Co., Forged Steel Handles	35

Forged Handles, Steel Blades, Berlin	50
Heinrich's Snips	40
Jennings & Griffin Mfg. Co.'s 6 1/2 to 10 in.	33 @ 33&10
National Cutlery Co.'s Forged Steel	50
Niagara Snips	40
P. S. & W. Forged Handles, 25"	50
W. R. W.	50
J. Wiss & Sons Co.	
Wiss Forged Steel	25

Pruning Shears—

Columbian Cutlery Co.	
Hedge, Wilcut Brand	60&10
Lawn and Border, Wilcut Brand	60&10
W. H. Compton Shear Co., Dropped Forged Steel	35
Cronk's Hand Shears	33
Cronk's Wood Handle Shears	33
Disston's Combined Pruning Hook and Saw	25
Disston's Pruning Hook only	25
doz., \$12.00	25
J. T. Henry Mfg. Co.	
Pruning Shears, all grades	40
P. S. & W. Co.	40&10
Seymour Smith & Son's:	
Hand Shears	70
Standard Tree Pruners	75&10
Wood Handle Pruning Shears	40

Sheaves—Sliding Door—

Reading	40
R. & E. list	15

Sliding Shutter—

Reading list	40
R. & E. list	15

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, 10 and 12 gauge	60&5
Club, Rival, 65&5; First Quality	60&5

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge	25&10
Climax, 10 and 12 gauge; Acme and Magic, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade	25&5
Union, League, 10 and 12 gauge, Rival Grade	25
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge; Monarch, 10, 12, 16 and 20 gauge; Repeater Grade	20

Loaded with Black Powder. 40%**Loaded with Smokeless Powder, medium grade. 40&5****Loaded with Smokeless Powder, high grade. 40&10&10****Union Metallic Cartridge Co.:**

New Club, Black Powders	40
Nitro Club, Smokeless Powders	40&5
Arrow, Smokeless Powders	40&10
Winchester:	
Smokeless Repeater Grade	40&5
Smokeless Leader Grade	40&10
Black Powder	40

Shingles, Metal—Per Sq.

Edwards Mfg. Co.:	
14 x 20	Painted, Galv. \$4.25
10 x 14	4.50
7 x 10	4.75
Wheeling Corrugating Co.:	
Dixie, 14 x 20 in.	\$4.05
Dixie, 10 x 14 in.	4.25
Dixie, 7 x 10 in.	5.25

Shoes, Horse, Mule, &c.—**F.o.b. Pittsburgh:**

Iron	per keg \$4.10
Steel	per keg \$5.85
Burdens', all sizes	per keg \$3.90

Shot—

Drop, up to B	\$1.70
Drop, B and larger	1.95
Buck	1.95
Chilled	1.95
Dust	2.30

Shovels and Spades—

Association List	40&10 @ 40&10
Avery Stamping Co.	40

Snow Shovels—

Long Handle	\$2.50 @ \$2.75
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Wood and Mail, D Handle.

	\$2.65 @ \$2.90
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Sieves and Sifters—

Hunter's Imitation, gro.	\$9.50
Hunter's Genuine, per gro.	\$12.00

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each	\$3.25
per doz.	\$39.00

Sieves, Seamless Metallic

Mesh	1 1/2 1 3/4 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10 10 1/2 11 11 1/2 12 12 1/2 13 13 1/2 14 14 1/2 15 15 1/2 16 16 1/2 17 17 1/2 18 18 1/2 19 19 1/2 20 20 1/2 21 21 1/2 22 22 1/2 23 23 1/2 24 24 1/2 25 25 1/2 26 26 1/2 27 27 1/2 28 28 1/2 29 29 1/2 30 30 1/2 31 31 1/2 32 32 1/2 33 33 1/2 34 34 1/2 35 35 1/2 36 36 1/2 37 37 1/2 38 38 1/2 39 39 1/2 40 40 1/2 41 41 1/2 42 42 1/2 43 43 1/2 44 44 1/2 45 45 1/2 46 46 1/2 47 47 1/2 48 48 1/2 49 49 1/2 50 50 1/2 51 51 1/2 52 52 1/2 53 53 1/2 54 54 1/2 55 55 1/2 56 56 1/2 57 57 1/2 58 58 1/2 59 59 1/2 60 60 1/2 61 61 1/2 62 62 1/2 63 63 1/2 64 64 1/2 65 65 1/2 66 66 1/2 67 67 1/2 68 68 1/2 69 69 1/2 70 70 1/2 71 71 1/2 72 72 1/2 73 73 1/2 74 74 1/2 75 75 1/2 76 76 1/2 77 77 1/2 78 78 1/2 79 79 1/2 80 80 1/2 81 81 1/2 82 82 1/2 83 83 1/2 84 84 1/2 85 85 1/2 86 86 1/2 87 87 1/2 88 88 1/2 89 89 1/2 90 90 1/2 91 91 1/2 92 92 1/2 93 93 1/2 94 94 1/2 95 95 1/2 96 96 1/2 97 97 1/2 98 98 1/2 99 99 1/2 100 100 1/2 101 101 1/2 102 102 1/2 103 103 1/2 104 104 1/2 105 105 1/2 106 106 1/2 107 107 1/2 108 108 1/2 109 109 1/2 110 110 1/2 111 111 1/2 112 112 1/2 113 113 1/2 114 114 1/2 115 115 1/2 116 116 1/2 117 117 1/2 118 118 1/2 119 119 1/2 120 120 1/2 121 121 1/2 122 122 1/2 123 123 1/2 124 124 1/2 125 125 1/2 126 12
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Scythe Stones—

Pike Mfg. Co., 100 lb. gro.	\$12.00
Black Diamond S. S., 100 lb. gro.	\$11.00
Lamotte S. S., 100 lb. gro.	\$9.50
White Mountain S. S., 100 lb. gro.	\$9.50
Green Mountain S. S., 100 lb. gro.	\$7.00
Extra Indian Pond S. S., 100 lb. gro.	\$8.00
No. 1 Indian Pond S. S., 100 lb. gro.	\$7.50
No. 2 Indian Pond S. S., 100 lb. gro.	\$5.00
Leader Red End S. S., 100 lb. gro.	\$5.00
Quick Cut Emery, 100 lb. gro.	\$10.00
Pure Corundum, 100 lb. gro.	\$18.00
Crescent, 100 lb. gro.	\$7.00
Emery Scythe Rifles, 3 Coat, 100 lb.	\$8.00
Emery Scythe Rifles, 4 Coat, 100 lb.	\$13.00
Balance of 1907 list, 33 1/2%	
Lectro (Artificial), 100 lb. gro.	\$12.00, 33 1/2%
Lightning (Artificial), 100 lb. gro.	\$12.00, 33 1/2%
Lightning (Artificial), 100 lb. gro.	\$18.00, 33 1/2%

Stoppers, Bottle—

Victor Bottle Stoppers, 100 gro.	\$9.00
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Stops—Bench—

Millers Falls, 150 doz.	\$15.10
Morrill's, No. 1, 100 doz.	\$10.00
Morrill's, No. 2, 100 doz.	\$10.50
Seymour Smith & Son's, 100 doz.	\$6.00

Door—

Chapin-Stephens Co., 50 doz.	\$50.10
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Plane—

Chapin-Stephens Co., 50 doz.	\$50.10
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Straps—Box—

Acme Embossed, case lots, 20 doz.	\$10.10
Cary's Universal, case lots, 20 doz.	\$10.10

Stretchers, Carpet—

Cast Iron, Steel Points, doz.	\$5.50
All Steel Socket, doz.	\$2.00
Excelsior Stretcher and Tack Hammer Combined, doz.	\$6.00

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses, 25 doz.	\$7.10
National Specialty Co., list Jan. 1, 1902, 30 doz.	\$3.50
P. S. & W. Co., 10 doz.	\$10.65

Sweepers, Carpet—

Goshen Sweeper Co., Per doz.	
Gilt Edge, 20 doz.	\$27.00
Superfine, 20 doz.	\$26.00
Majestic, 20 doz.	\$24.00
Select, Nickered, 20 doz.	\$22.00

National Sweeper Co., 20 doz.	\$27.00
National Queen, Nickered, 20 doz.	\$25.00
Martha Washington, Nickered, 20 doz.	\$20.00
Monarch, Japanned, 20 doz.	\$18.00
Perpetual, Japanned, 20 doz.	\$18.00
Streator Metal Stamping Co., Model E, Sanitaire, 20 doz.	\$25.00
Eureka, 15 doz.	\$15.00
Streator Majestic, Nickered, 20 doz.	\$24.00
Streator Conqueror, Japanned, 20 doz.	\$22.00

NOTE—Leading Manufacturers give the following rebates from list prices, 50c per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks, 90 doz.	\$25.00
American Cut Tacks, 90 doz.	\$25.00
Swedes' Cut Tacks, 90 doz.	\$25.00
Swedes' Upholsterers' Tacks, 90 doz.	\$25.00
Gimp Tacks, 90 doz.	\$25.00
Lace Tacks, 90 doz.	\$25.00
Trimmers' Tacks, 90 doz.	\$25.00
Looking Glass Tacks, 90 doz.	\$25.00
Bill Posters' and Railroad Tacks, 90 doz.	\$25.00

Hungarian Nails, 100 doz.	\$9.00
Finishing Nails, 100 doz.	\$9.00
Trunk and Clout Nails, 100 doz.	\$9.00

NOTE—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks, 90 doz.	\$25.00
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See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co., Gal.	\$3.00
Gal., 50	\$2.75
60	\$3.50
100	\$4.00
150	\$5.00

Tapes, Measuring—

American Asses' Skin, 50 doz.	\$50.00
Patent Leather, 25 doz.	\$30.45
Steel, 33 1/2 doz.	\$31.45
Chesterman's, 25 doz.	\$25.45

Keuffel & Esser Co., Favorite, Ass Skin, 40 doz.	\$40.10
Favorite, Duck and Leather, 25 doz.	\$25.10

Metallic and Steel, lower list, 35 doz.	\$35.50
35 doz.; Pocket, 35 doz.	\$35.50

Lufkins:

Asses' Skin, 40 doz.	\$40.10
Metallic, 30 doz.	\$30.45
Patent Bend, Leather, 25 doz.	\$25.10
Pocket, 40 doz.	\$40.45
Steel, 33 1/2 doz.	\$33.45

Wiebusch & Hilger:

Chesterman's Metallic, No. 31L, etc., 25 doz.	\$25.10
Chesterman's Steel, No. 103L, etc., 25 doz.	\$25.10

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger per 100 lb.	\$22.50
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Thermometers—

Tin Case Cabinet, Flange, Dairy, etc., 30 doz.	\$30.45
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Ties, Bale—Steel Wire—

Single Loop, 82 1/2 doz.	\$82.10
Monitor, Cross Head, etc., 70 doz.	\$70.25

Tinner's Shears, &c.—

See Shears, Tinner's, &c.	
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Tinware—

Stamped, Japanned and Piced, sold very generally at net prices.	
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Tire Benders, Upsetters, &c. See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White, 20 doz.	\$20.50
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Haying—

Myers' Hay Tools, 50 doz.	\$50.00
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Ice Tools—

Gifford-Wood Co., 15 doz.	\$15.00
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Miniature—

Smith & Hemenway Co.'s, David-son, 10 doz.	\$10.50
Gold Plated, 10 doz.	\$2.00

Saw—

Atkins' Cross Cut Saw Tools, 35 doz.	\$35.50
Simond's Improved, 33 1/2 doz.	\$33.50
Simond's Crescent, 30 doz.	\$30.00

Ship—

L. & I. J. White, 25 doz.	\$25.00
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Torches—

Hammers, Engine, 10 doz.	\$15.00
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Transom Lifters—

See Lifters, Transom.	
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Traps—Fly—

Balloon, Globe or Acme, doz.	\$1.15
Harper, Champion or Paragon, doz.	\$1.25

Game—

Imitation Oneida, 75 doz.	\$75.10
Newhouse, 50 doz.	\$50.50
Hawley & Norton, 65 doz.	\$65.10
Victor, 75 doz.	\$75.10
Oneida Community Jump, 70 doz.	\$70.50
Stop Thief, 60 doz.	\$60.00
Tree Trap, 60 doz.	\$60.00
Hector, 75 doz.	\$75.10

Mouse and Rat—

Mouse, Wood, Choker, doz. holes,	12¢
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Mouse, Round or Square Wire, doz.	\$5.90
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Marty French Rat and Mouse Traps (Genuine), 10 doz.	\$10.00
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Crate lots. Small lots.	
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No. 1, Rat, 100 doz.	\$11.50
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No. 3, Rat, 100 doz.	\$5.75
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No. 3 1/2, Rat, 100 doz.	\$5.75
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No. 5, Mouse, 100 doz.	\$3.00
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Animal Trap Co.,	
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Out o' Sight, Mouse, 10 doz.	\$0.60
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Out o' Sight, Rat, 10 doz.	1.20
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Easy Set, Mouse, 10 doz.	.35
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Easy Set, Rat, 10 doz.	.85
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Out o' Sight Chokers, 10 doz.	.12
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Out o' Sight, Tin, 5-hole, 10 doz.	.75
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Trowels—

Disston Brick and Pointing, 25 doz.	\$25.00
Disston Plastering, 20 doz.	\$20.00
Disston "Standard Brand" and Garden Trowels, 30 doz.	\$30.00
Kohler's Steel Garden Trowels, 10 doz.	\$10.00
Never-Break Forged Steel Garden Trowels, in bulk, net 10 doz.	\$5.50
In 1 doz. boxes, 10 doz.	\$6.00
Woodrough & McParlin, Plastering, 25 doz.	\$25.00

Trucks, Warehouse, &c.—

B. & L. Block Co.,	
New York Pattern, 50 doz.	\$50.10
Western Pattern, 60 doz.	\$60.10
Handy Trucks, 10 doz.	\$16.00
Grocery, 10 doz.	\$15.00
McKinney Trucks, each, net 10 doz.	\$10.00
Model Store Trucks, 10 doz.	\$18.50

Tubs, Wash—

Mfg's list, price per gross.	
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No. 0 1 2 3	
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Galvanized, \$67 \$79 \$91 \$103 104 7 1/2	
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45¢ 65¢ 70¢	
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Prices low and irregular.	
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Twine, Miscellaneous—

Flax Twine:	
No. 3, 1/4 and 1/2-lb. Balls, 21 at 25¢	
No. 12, 1/4 and 1/2-lb. Balls, 19 at 21¢	
No. 18, 1/4 and 1/2-lb. Balls, 16 at 18¢	
No. 24, 1/4 and 1/2-lb. Balls, 15 at 15¢	

No. 36, 1/4 and 1/2-lb. Balls, 15 at 15¢	
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Chalk Line, Cotton 1 1/2-lb.	
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Balls, 24 at 29¢	
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Cotton Mops, 6, 9, 12 and 15 lb. to doz.	\$14.00
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Cotton Wrapping, 5 Balls to lb., according to quality, 15¢ at 19¢	
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American 2-Ply Hemp, 1 1/2 and 1 3/4-lb. Balls, 15¢ at 16¢	
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American 3-Ply Hemp, 1-lb. Balls, 15¢ at 16¢	
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India 2-Ply Hemp, 1 1/2-lb. Balls, 15¢ at 16¢	
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India 3-Ply Hemp, 1-lb. Balls, 15¢ at 16¢	
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2, 3, 4 and 5-Ply Jute, 1 1/2-lb. Balls, 9¢ at 11¢	
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Mason Line, Linen, 1/2-lb. Balls, 17¢	
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No. 25 Mattress, 1/4 and 1/2 lb. Balls, according to quality, 30¢ at 60¢	
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Wool, 3 to 6 ply, B 6¢; A 7 1/2¢	
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Vises—

Solid Box, 60 at 60¢ 10¢	
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Parallel—

Athol Machine Co.,	
Simpson's Adjustable, 40 doz.	\$40.00
Standard, 40 doz.	\$40.00
Amateur, 25 doz.	\$25.00
Columbian Hdw. Co., 40 doz.	\$40.00
Slide, 65 doz.	\$65.00

Fisher & Norris Double Screw, each, Nos. 2, \$10.50; 3, \$10.00; 4, \$20.50;	
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5, \$27.00; 6, \$32.00; 7, \$35.00; 8, \$38.00;	
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Fisher-Brooks Bench Vises, No. 0, \$3.80; No. 1, \$5.90; No. 2, \$8.25;	
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No. 3, \$10.50; No. 4, \$13.50; 15¢ at 10¢	
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Fulton Mach. & Vise Co.:

F. & R. Double Swivel Machinists, 40 doz.	\$40.00
Star, Solid Jaw, Machinists, 40 doz.	\$40.00

Holland's:	
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Machinists, 40 at 40¢ 5¢	
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Keystone, 65 at 5¢ 10¢	
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Lewis Tool Co.,	
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Adjustable Jaw, 30 doz.	\$30.00
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Monarch, 50 doz.	\$50.00
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Massey Vise Co.,	
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Clincher, 40 doz.	\$40.00
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Parallel Bar, 15 doz.	\$15.00
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Perfect, 15 doz.	\$15.00
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Merrill's, 25 doz.	\$25.00
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Millers Falls Oval Slide Pattern, 60 at 10¢	
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Parker's:	
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Victor, 20 at 25¢; Regulars, 20 at 25¢	
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Vulcan's, 40 at 45¢	
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Combination Pipe, 55 at 60¢	
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Prentiss, 20 at 25¢	
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Rock Island, 25 doz.	\$25.00
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Snediker's, 30 doz.	\$30.00
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Stephens, 33 1/2 doz.	\$33.50
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Saw Filers

Disston's D 3 Clamp and Guide, 10 doz.	\$24.00
Lightning Grip, 30 doz.	\$30.00
Perfection Saw Clamps, 10 doz.	\$15.00
Reading, 60 doz.	\$60.00

Wood Workers—

Fulton Mach. & Vise Co.,	
F. & R. Double Swivel Coachman's, 40 doz.	\$40.00
Star Solid Jaw Woodworkers', 60 doz.	\$60.00

Massey Vise Co.,	
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Lightning Grip, 15 doz.	\$15.00
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Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.	
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Miscellaneous—

Fulton Machine & Vise Co., Combination Pipe, 70 doz.	\$70.00
Holland's Combination Pipe, 60 at 60¢	
Massey's Quick Action Pipe, 40 doz.	\$40.00
Parker's Combination Pipe, 87 Series, 60 doz.; 187 Series, 60 at 5¢; No. 870, 40 doz.	
Rock Island Pipe, 25 doz.	\$25.00

Wads—Price per M.	
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B. E., 11 up, 60¢	
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B. E., 9 and 10, 70¢	
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B. E., 8, 80¢	
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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—			Genuine Iron Sheets— Galvanized.			Copper—		
Refined Iron:			Nos. 22 and 24			Lake Ingot		
1 to 1 1/4 in. round and square	per lb	1.70¢	No. 26	per lb	.575¢	Electrolytic		
1 1/4 to 4 in. x 1/2 to 1 in.	per lb	1.90¢	No. 28	per lb	.625¢	Casting		
1 1/2 to 4 in. x 1/2 to 5-16.	per lb	1.90¢	Corrugated Roofing—			Sheet Copper Hot Rolled, 16 oz (quantity lots)		
Rods—1/2 and 11-16 round and square	per lb	1.90¢	2 1/4 in. corrugated			Sheet Copper Cold Rolled, 1¢ more than advance over Hot		
Angles:	Cts	per lb	No. 24			Rolled		
3 in. x 1/2 in. and larger	per lb	1.95¢	No. 26			Sheet Copper Polished 20 in. wide and under, 1¢		
3 in. x 3/4 in. and 1/2 in.	per lb	2.15¢	No. 28			square foot		
1 1/2 to 2 1/2 in. x 1/2 in.	per lb	1.95¢	Tin Plates—			Sheet Copper Polished over 20 in. wide, 2¢		
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	per lb	1.85¢	American Charcoal Plates (per box.)			foot		
1 to 1 1/4 in. x 3/4 in.	per lb	1.95¢	"A. A. A." Charcoal:			Finished Copper, 1¢ more than Polished.		
1 to 1 1/4 in. x 1/2 in.	per lb	2.00¢	IC, 14 x 20			Spelter—		
3/4 x 1/2 in.	per lb	2.15¢	IX, 14 x 20			Western		
3/4 x 1/2 in.	per lb	2.25¢	A. Charcoal:			Zinc.		
3/4 x 3/8 in.	per lb	3.30¢	IC, 14 x 20			No 9, base, casks, 7.50¢ Open		
3/4 x 3/8 in.	per lb	3.80¢	IX, 14 x 20			Lead.		
Tees:	per lb		American Coke Plates—Bessemer—			American Pig		
1 in.	per lb	2.25¢	IC, 14 x 20			Bar		
1 1/4 in.	per lb	2.05¢	IX, 14 x 20			Solder.		
1 1/2 to 2 1/2 in.	per lb	1.90¢	American Terne Plates—			1/2 & 1/4, guaranteed		
3 in. and larger	per lb	2.05¢	IC, 14 x 20			No. 1		
Beams	per lb	2.00¢	IX, 14 x 20			Refined		
Channels, 3 in. and larger	per lb	2.00¢	Seamless Brass Tubes—			Prices of Solder indicated by private brand vary ac-		
Bands—1 1/2 to 6 x 3-16 to No. 8	per lb	2.05¢	List December 4, 1905.			According to composition.		
"Burdens' Best" Iron, base price	per lb	3.15¢	Brass Tubes, Iron Pipe Sizes—			Antimony—		
Burdens' "H. B. & S." Iron, base price	per lb	2.95¢	List December 4, 1905.			Cookson		
Norway Bars	per lb	3.30¢	Copper Tubes—			Halletts		
Merchant Steel from Store—			List December 4, 1905.			Other Brands		
Bessemer Machinery	per lb	1.70¢	Braze Brass Tubes—			Per lb		
Toe Calk, Tire and Sleigh Shoe	per lb	2.50¢	List August 1, 1908.			Bismuth—		
Best Cast Steel, base price in small lots	per lb	.70¢	High Brass Rods—			Aluminum—		
Sheets from Store—			List August 1, 1908.			No. 1 Aluminum (guaranteed over 99% pure), in ingot		
Black			Roll and Sheet Brass—			for remelting		
One Pass, C.R.			List August 1, 1908.			Rods & Wire		
Soft Steel			Brass Wire—			Base Price 33¢		
Cleaned			List August 1, 1908.			Base Price 34¢		
No. 16	per lb	2.90¢	Copper Wire—			Old Metals.		
Nos. 18 to 21	per lb	2.85¢	Base Price,			Dealers' Purchasing Prices Paid in New York		
Nos. 22 and 24	per lb	2.95¢	Carload lots mill 15¢			Copper, Heavy cut and crucible		
No. 26	per lb	3.10¢	METALS—			Copper, Heavy and Wire		
No. 28	per lb	3.10¢	Tin—			Copper, Light and Bottoms		
Russia, Planished, &c.			Straits Pig			Brass, Heavy		
Genuine Russia, according to assort-			per lb 80¢ @ \$1.14¢			Brass, Light		
ment						Heavy Machine Composition		
Patent Planished, W. Dewees Wood						Clean Brass Turnings		
Galvanized.						Composition Turnings		
Nos. 14 to 16						Lead, Heavy		
Nos. 22 to 24						Lead Tea		
No. 26						Zinc Scrap		
No. 28								
No. 20 and lighter 36 inches wide, 25¢ higher.								

THE IRON AGE

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